AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

NOVEMBER 1, 1957

NATIONAL METAL SHOW NUMBER

In This Issue

Details of the 1958 Buick, Chevrolet, Chrysler, Continental, De Soto, Dodge, Imperial, Lincoln, Mercury, Oldsmobile, Plymouth and Pontiac.
New Trucks Brought Out by Dodge and Studebaker
Improved Arc Welding Methods at Allison Plant
Preview of New Equipment at National Metal Show

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A CHILTON PUBLICATION

New from Standard Oil

RYKON

GREASE

Standard scores major breakthrough in grease technology to bring you better lubrication . . . help you make important savings in grease use, application and inventorying.

Scientists at Standard Oil have developed a new non-soap, organic, grease thickening agent. This, plus other improvements in grease formulation, is now available in a new line of Standard greases named RYKON.

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Oxidation stability—Exclusive thickener in RYKON Greases inhibits oxygen absorption. This prevents costly corrosive action on bearings.

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High temperature stability—RYKON Greases have an ASTM dropping point of 480° F. They have exceptional heat stability.

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To meet specific grease lubrication problems, greases in four Regular and three Heavy Duty grades are available. With a single RYKON multi-purpose grease doing all jobs in the plant, there's no wrong grease to use. Money invested in grease inventories is cut, storage and application facilities are reduced. Maintenance training is simplified.

Get the facts about RYKON Greases from the industrial lubrication specialist at the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

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40 tons of ore...

trip after trip, hour after hour, with **COTTA HEAVY-DUTY TRANSMISSIONS**

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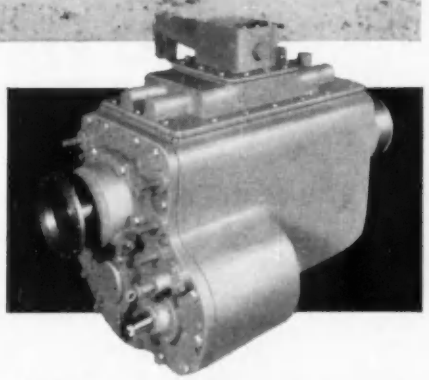
The COTTA Model GA-966 is another specially engineered heavy duty transmission which meets the rigid requirements of these giant trucks. Compact, rugged, easy to control, it combines three forward speeds and a reverse with the converter for smooth power flow through a wide range of torque and speed conditions. It has the same special heavy-duty features that make COTTA Transmissions and Reduction Gears so important to builders of cranes, locomotives, pumps, drilling rigs, trucks, hoists, and other equipment requiring heavy-duty or special gear-boxes.



If you are considering torque converters for your mobile equipment . . . or if you have any speed change or reversing problem that requires extreme ruggedness and dependability in the input range of 150 to 2000 foot-pounds, take advantage of the offer described below — find out what Cotta can do for you!

THIS INFORMATION WILL HELP YOU

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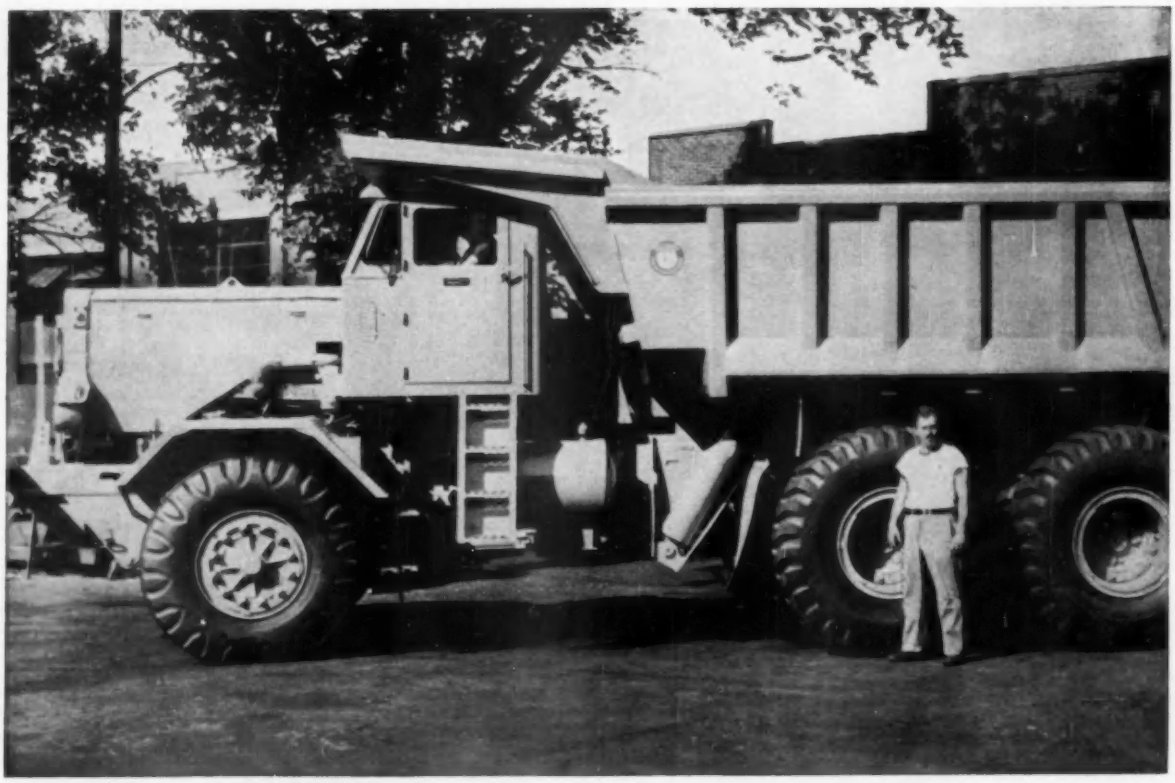

Newest Dart 55-ton...

Nickel alloy steels lighten ore carrier axles, absorb terrific loads and impacts

"In 22 years," Dart metallurgists say, "we've found no stronger, tougher axle steels"

This is a real bear cat . . . 55 tons, 25 cubic yards, 400 horsepower.

It's the latest of a long line of heavy-duty, high-capacity Dart trucks.

Like their first model built 22 years ago, it is designed for maximum load capacity and minimum tare weight. And like their first (many of which are *still* in service) its axle shafts are forged of 4340 nickel-chromium-molybdenum steel. They are heat-treated to a hardness of 400/440 Brinell, equivalent to tensile strengths ranging above 200,000 p.s.i.

The housings are alloy steel castings, of approximately Type 4335 composition, heat-treated to provide a minimum tensile strength of 100,000 and yield strength of 85,000 p.s.i.

Dart has never found another steel to equal the 4300 type for heavy-duty axles . . . and they've tried many. Here's what it gives them:

1. Dependable high strength that allows safe designing for low weight.
2. Toughness to resist bone-shaking impact under heavy loads and low operating temperatures.
3. Good machinability at high hardness.
4. Excellent hardenability.
5. Ready weldability along with high strength in cast housings.

Light, strong, easy-to-fabricate. This is the axle assembly for the Dart ore carrier. Housing contains a triple reduction power transmission; wheels, a double reduction carrier and single reduction planetary. To increase the strength/weight ratio and obtain top-notch casting and machining properties, Dart Truck Company, Kansas City, Mo. makes both shaft and housing of medium carbon nickel-chromium-molybdenum steels.

* * *

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AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE — PUBLISHED SEMI-MONTHLY

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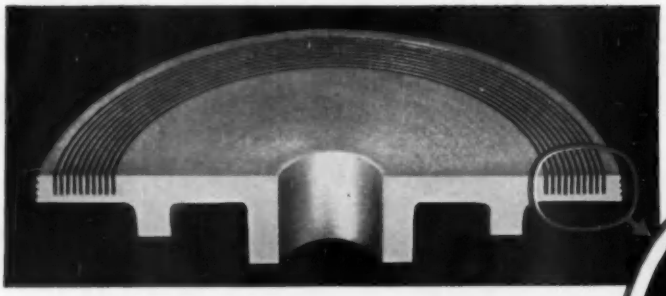
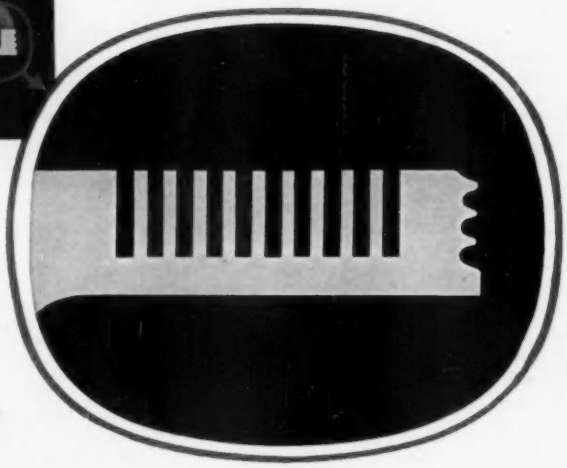
Do Your Castings Require Sharp Corners *Like These?*





The Denser Structure of EATON PERMANENT MOLD GRAY IRON CASTINGS

Permits the Machining of Precise Corners

The part shown above required that 10 grooves, .023" wide and .125" deep, leaving 9 lands .015" wide, be rapidly and simultaneously machined. Eaton Permanent Mold Iron proved to be the ideal material—completely eliminating the problem of curling chips in the small grooves, and crumbling of lands during machining.

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If you have applications which require these exceptional characteristics, our engineers will be happy to work with you.

Check these Important Advantages:

- ★ **Dense, non-porous, homogeneous structure**
- ★ **Freedom from inclusions**
- ★ **Excellent tensile strength**
- ★ **Ability to take a high surface finish**
- ★ **Freedom from leakage under pressure**
- ★ **Intricately cored sections**
- ★ **Uniformity of castings**
- ★ **Higher machining feeds and speeds**
- ★ **Substantially increased tool life**

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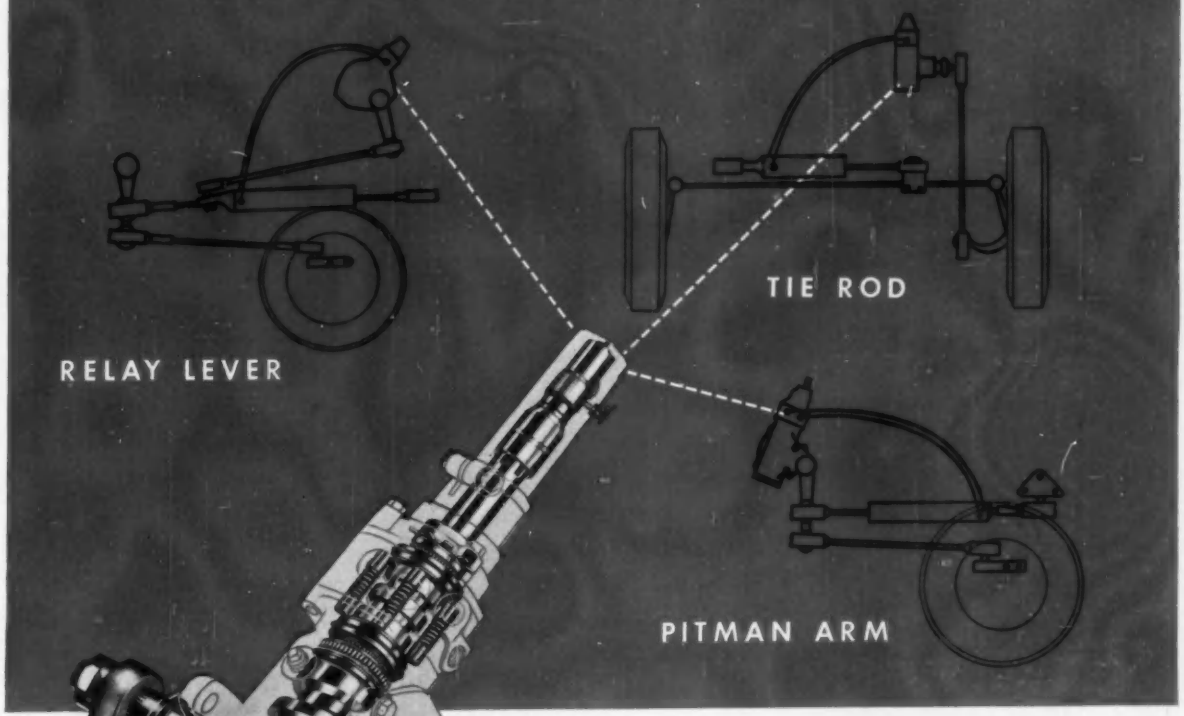
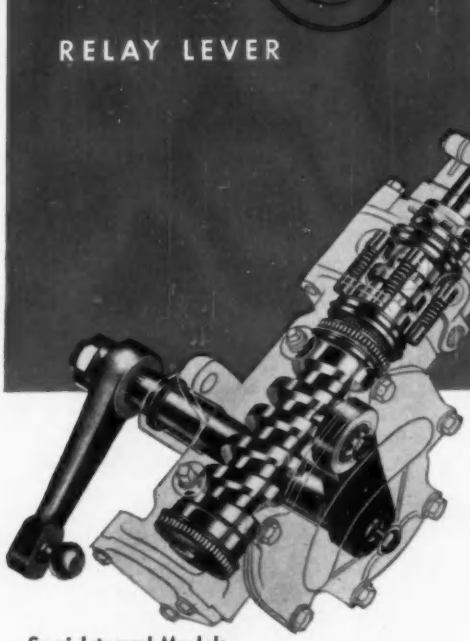
TYPICAL HYDRAPOWER APPLICATIONS





Semi-Integral Models
HPS-52 and HPS-70

Versatile...effortless

▶ **The HPS-type Ross** steering gear is a compact, semi-integral assembly that permits easy, space-saving installation with the same type of mounting used with mechanical steering gears.

A hydraulic cylinder, installed in the linkage, supplies the "boost" for fatigueless power steering, without disturbing the quality of "road sense" obtained with the conventional Ross manually-operated gear.

Ross Hydrapower is engineered for easy installation and easy steering—enabling the driver to maintain better control in event of tire failure, soft ground, sand, snow or road obstruction. There is no lag in the hydraulic response either for power assistance or resisting shocks—consequently, no tendency to over control.

Ross makes all three types of hydraulic power steering—integral, semi-integral, and linkage—and invites discussion of any steering problem, power or manual.

Ross HYDRAPOWER

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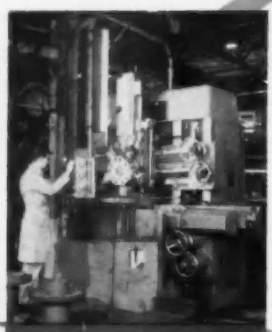
no need for Obsolescence with **BULLARD**

VERTICAL TURRET LATHES

Model 75



36" Bullard Cut Master V.T.L., Model 75 manually controlled from Pendant Control.

Bullard Service Engineer guides Man-Au-Trol Conversion Unit into place.

Electrical connections for Man-Au-Trol are wired into Cut Master Control Panel.

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it was evident that due to increased requirements an automatically controlled machine was necessary. *Did this obsolete the Cut Master?* — No sir — it only meant adding a Man-Au-Trol Conversion Unit to Cut Master *right in their plant. And it was accomplished in only four days.* No need to obsolete Bullard Cut Master, Model 75 — just convert them.

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Man-Au-Trol installed for automatic control of Turret Head.

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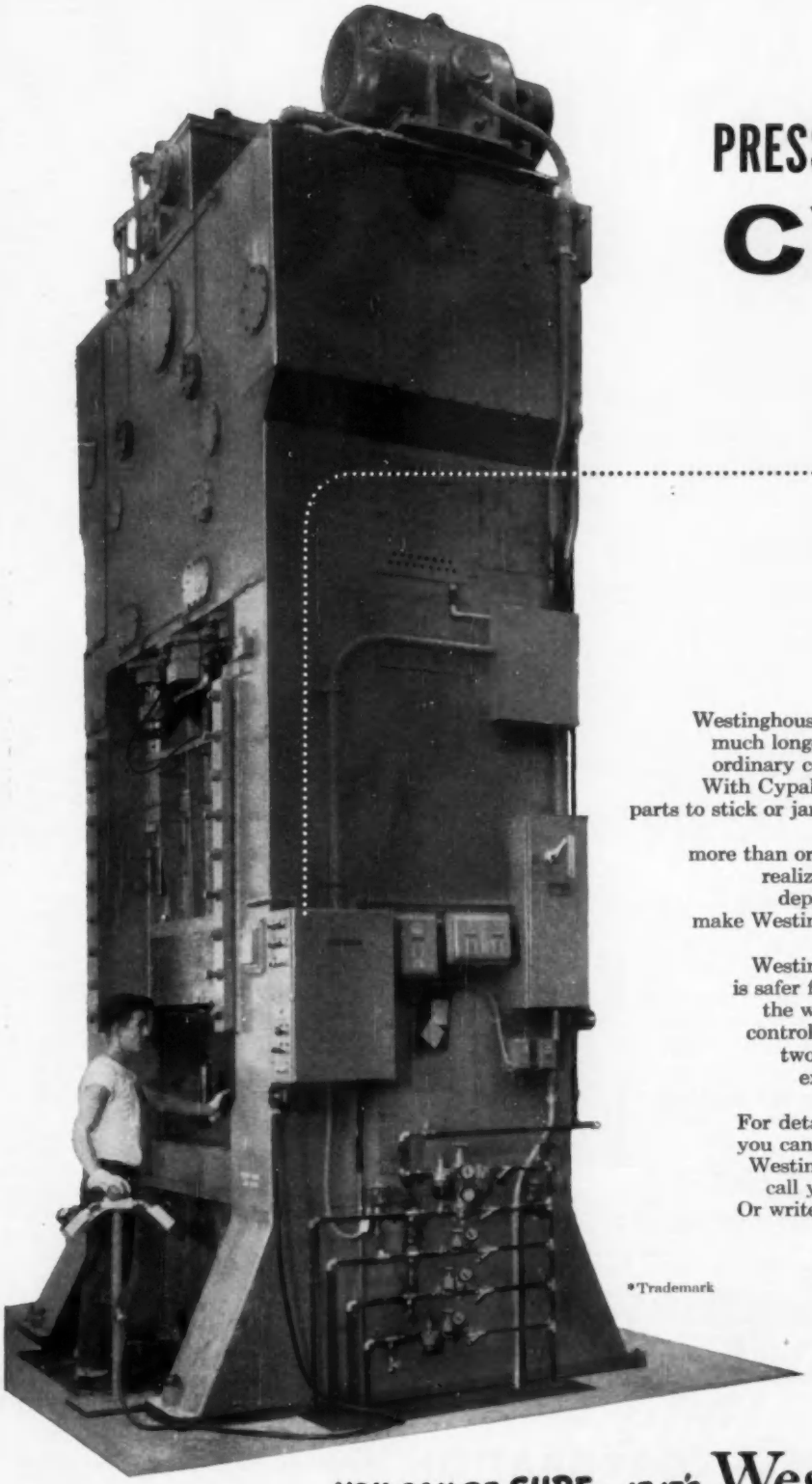
WESTINGHOUSE PRESS CONTROL WITH CYPAK



Westinghouse press controls with Cypak* last much longer . . . up to 15 times longer than ordinary controls using conventional relays. With Cypak static control there are no relay parts to stick or jam and cause a repeat of the press. Priced at less than $200 more than ordinary press controls, the savings realized from many additional years of dependable, maintenance-free service make Westinghouse press control with Cypak your most economical buy.

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For detailed information about the ways you can benefit from safer, longer lasting Westinghouse press control with Cypak, call your Westinghouse sales engineer. Or write to Westinghouse Electric Corp., 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

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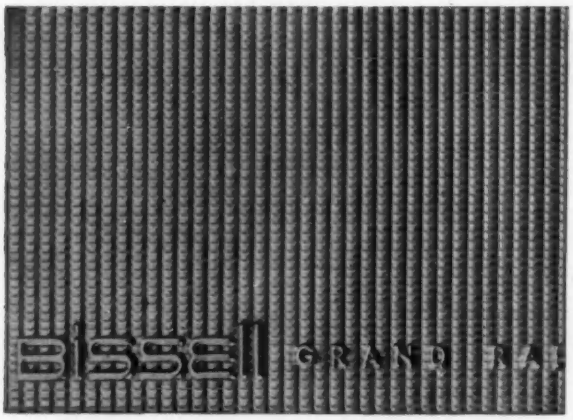
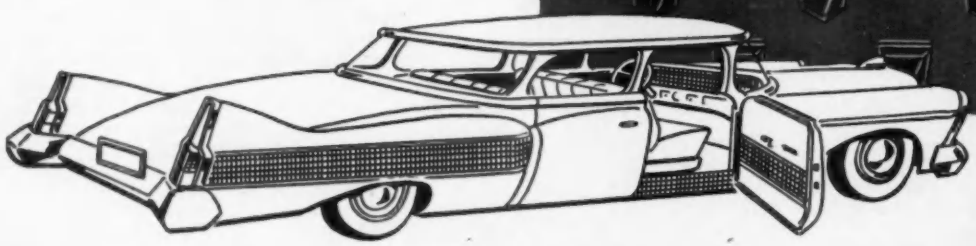


Above: Special pattern developed from company name.

Above: Special pattern developed from company initials.

Right: Special pattern developed from company trademark.



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57-40

Up to 40% higher tightening torques keep a

—and only the combination of an UNBRAKO screw

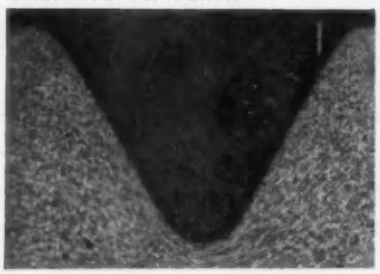
RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

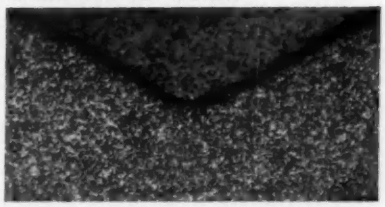
Here's why a High-Torque UNBRAKO can be seated tighter—and stay put

UNBRAKO SET SCREW



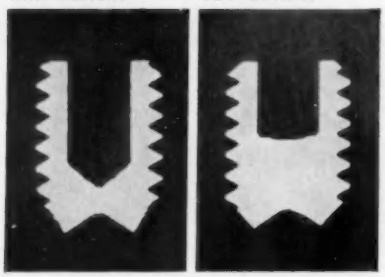
It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



The High-Torque UNBRAKO has a radius in the socket corners. This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower torques than those recommended for UNBRAKO.

UNBRAKO SET SCREW **ORDINARY SET SCREW**



The High-Torque UNBRAKO has a deeper socket, which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

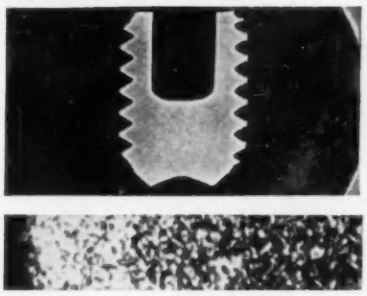
UNBRAKO SET SCREW

The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening

High-Torque UNBRAKO socket set screw tight

and key assures full *high-torque* performance

ORDINARY SET SCREW



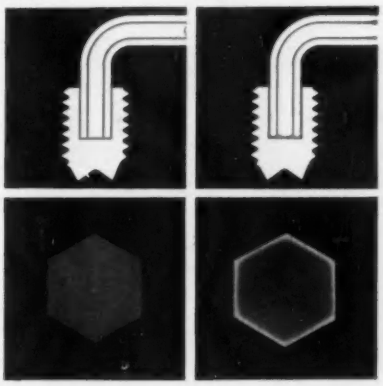
torques are applied. The ordinary screw is suffering from an overdose of decarburization; socket walls, threads and point are full of the telltale white spots that identify it.

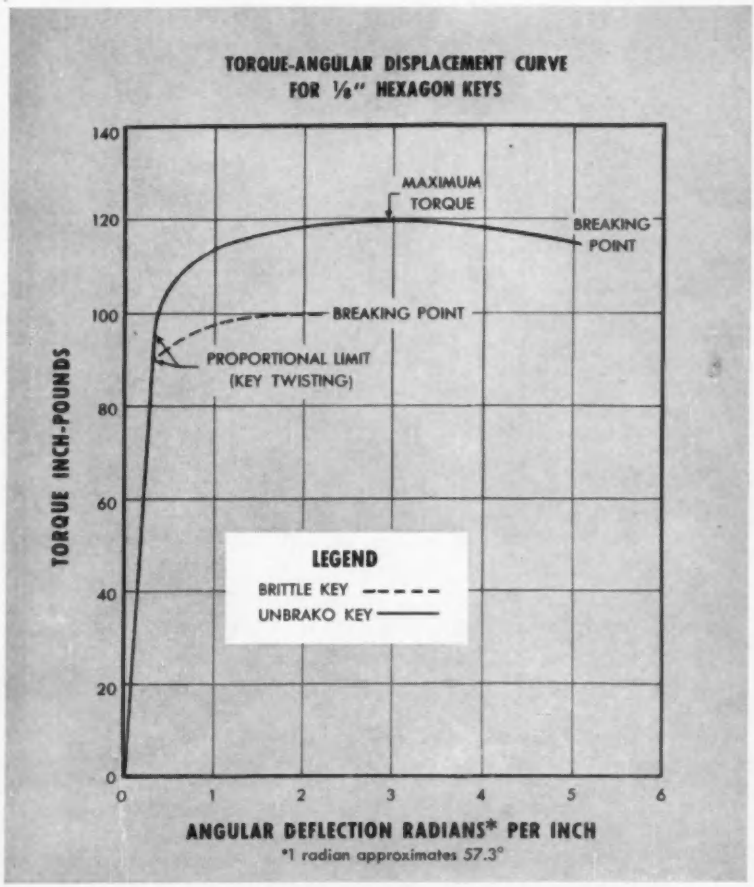
And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

The High-Titan UNBRAKO is not an ordinary hex key. It is a precision internal wrenching tool with high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel bar stock, inspected magnetically and chemically to make sure that the material is flawless and of the specified properties. Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. It won't ream or wear an UNBRAKO socket. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO KEY **CHAMFERED END KEY**





The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is casehardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for ⅛ in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key. The High-Titan UNBRAKO has a higher yield point and a higher breaking point—you can exert a much higher torque with it without snapping the key.

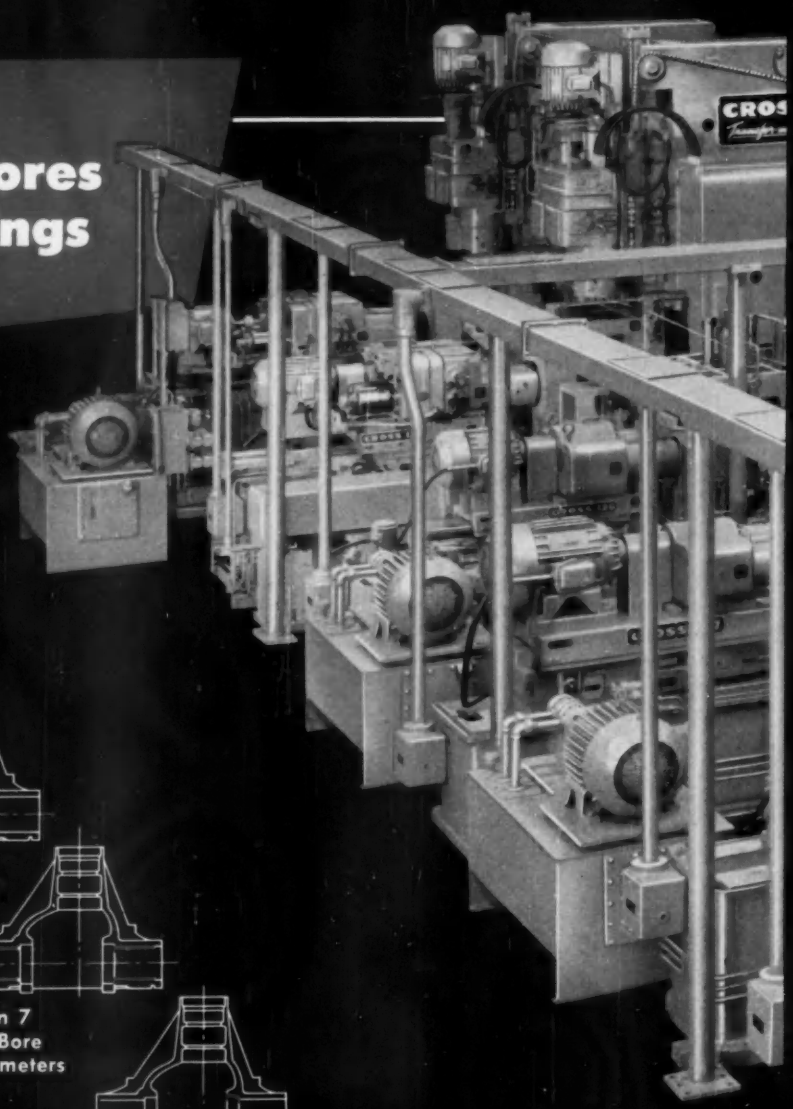
Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 53, Pa.

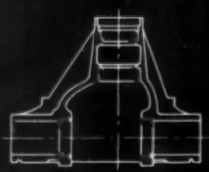
We also manufacture precision titanium fasteners. Write for free booklet.

Unbrako Socket Screw Division **sps** **Jenkintown, Pennsylvania**

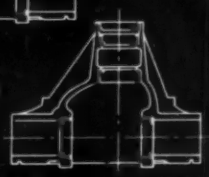
Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Cooper Precision Products • Standco Canada, Ltd. • Unbrako Socket Screw Co., Ltd.

Precision Bores Axle Housings

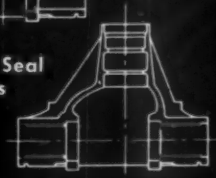




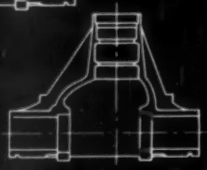
Station 11
Finish Bore
Four Bearing Seats



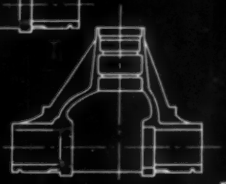
Station 9
Semi-Finish Bore Oil Seal
and Bearing Seats



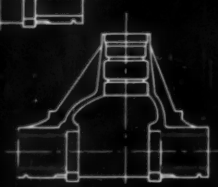
Station 7
Finish Bore
Tube Diameters



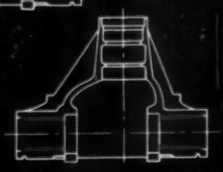
Station 5
Rough Back-bore
Right Side



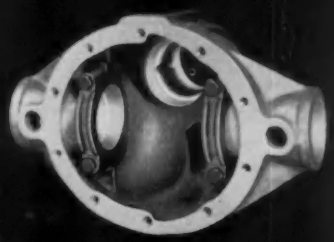
Station 4
Rough Back-bore
Left Side



Station 3
Semi-Finish Bore
Tube Diameters

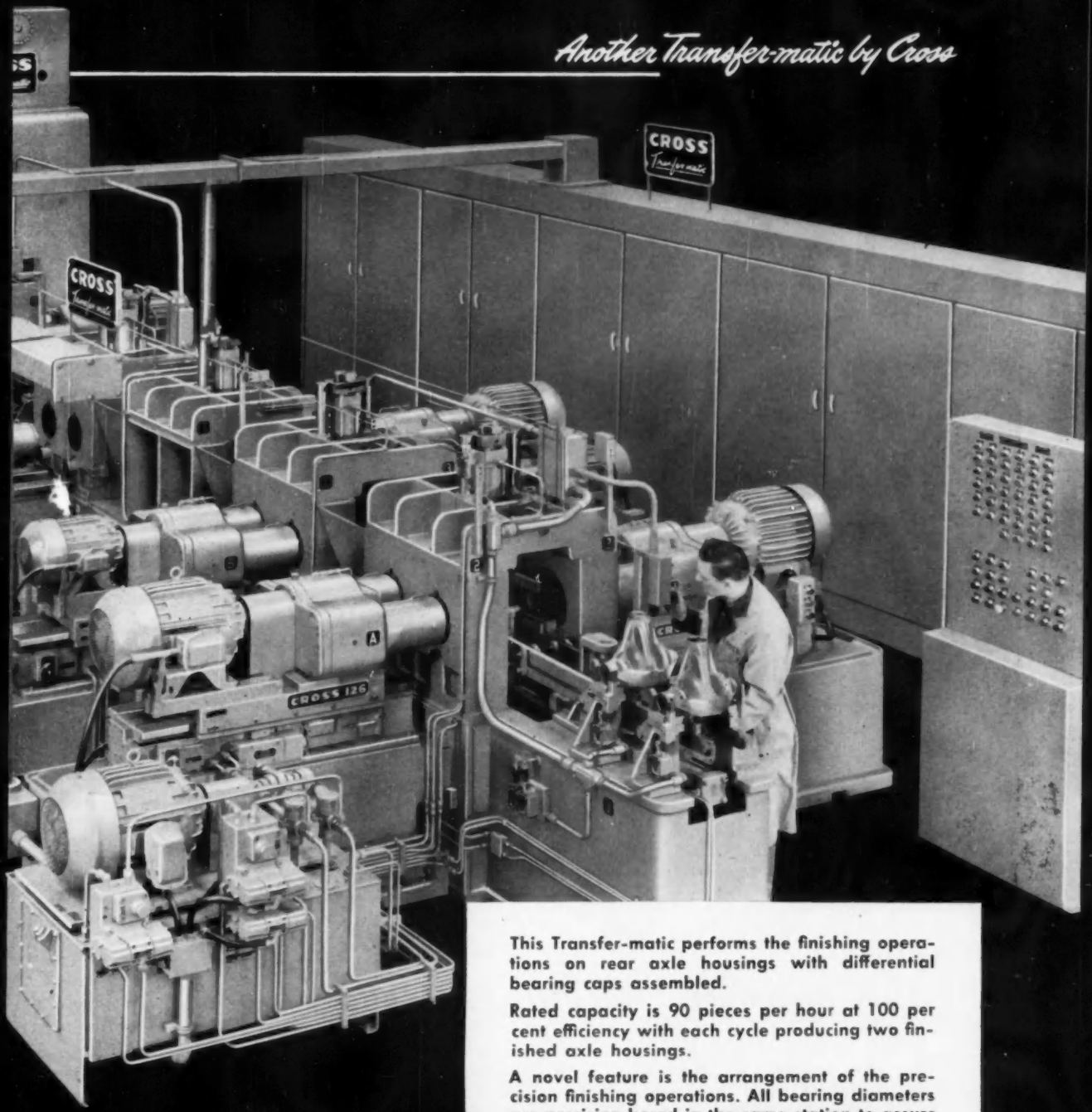


Station 2
Rough Bore
Tube Diameters



Station 1
Load Two Parts

Another Transfer-matic by Cross



This Transfer-matic performs the finishing operations on rear axle housings with differential bearing caps assembled.

Rated capacity is 90 pieces per hour at 100 per cent efficiency with each cycle producing two finished axle housings.

A novel feature is the arrangement of the precision finishing operations. All bearing diameters are precision bored in the same station to assure precise gear centers. The vertical boring unit finishes first one and then the other of the two pinion shaft bearing diameters. In the same station, opposed horizontal units back-bore the differential bearing diameters. Perfect concentricity and squareness of the shoulders are obtained between the two pinion bearing seats since both are bored with the same spindle.

Other features are complete interchangeability of all standard and special parts for easy maintenance, construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse and automatic lubrication.

Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Contact speed and burning are directly related — excessive burning of contacts will occur with either too slow or too rapid contact break. The former delays arc extinction, the latter frequently causes flashover between stationary contacts. Exclusive Westinghouse direct-drive Geneva gear mechanism consistently assures optimum speed. Result . . . arc extinction at first current zero — no flashover, minimum burning.
Westinghouse announces
20-year contact life warranty
For URS tap-changing mechanism . . . regardless of number of operations
Field inspections of scores of URS tap-changing mechanisms, in service 8 years or more, show negligible contact wear and burning. Based on this proved performance, Westinghouse now offers a 20-year prorated warranty on contact life — regardless of number of operations!
Load tap changers are direct dri
action assures optimum sp
prevent burning. T
is not pos

This Customer's Ad Tells the Mallory Story . . .

Mallory Elkonite®-3W3, a superior grade contact alloy especially suited for heavy duty service, helped make this important plus-service possible. Elkonite is one of many contact materials pioneered by Mallory for the electrical equipment manufacturing industry.

For contact metals, or for contact design, do as many manufacturers have done—call on Mallory, specialists in contact metallurgy, for *complete* assistance, from materials selection to contact design and production. Write, or call the nearby Mallory representative.

Expect more . . . get more from

Serving Industry with These Products:

Electromechanical — Resistors • Switches • Tuning Devices • Vibrators
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Metallurgical — Contacts • Special Metals • Welding Materials

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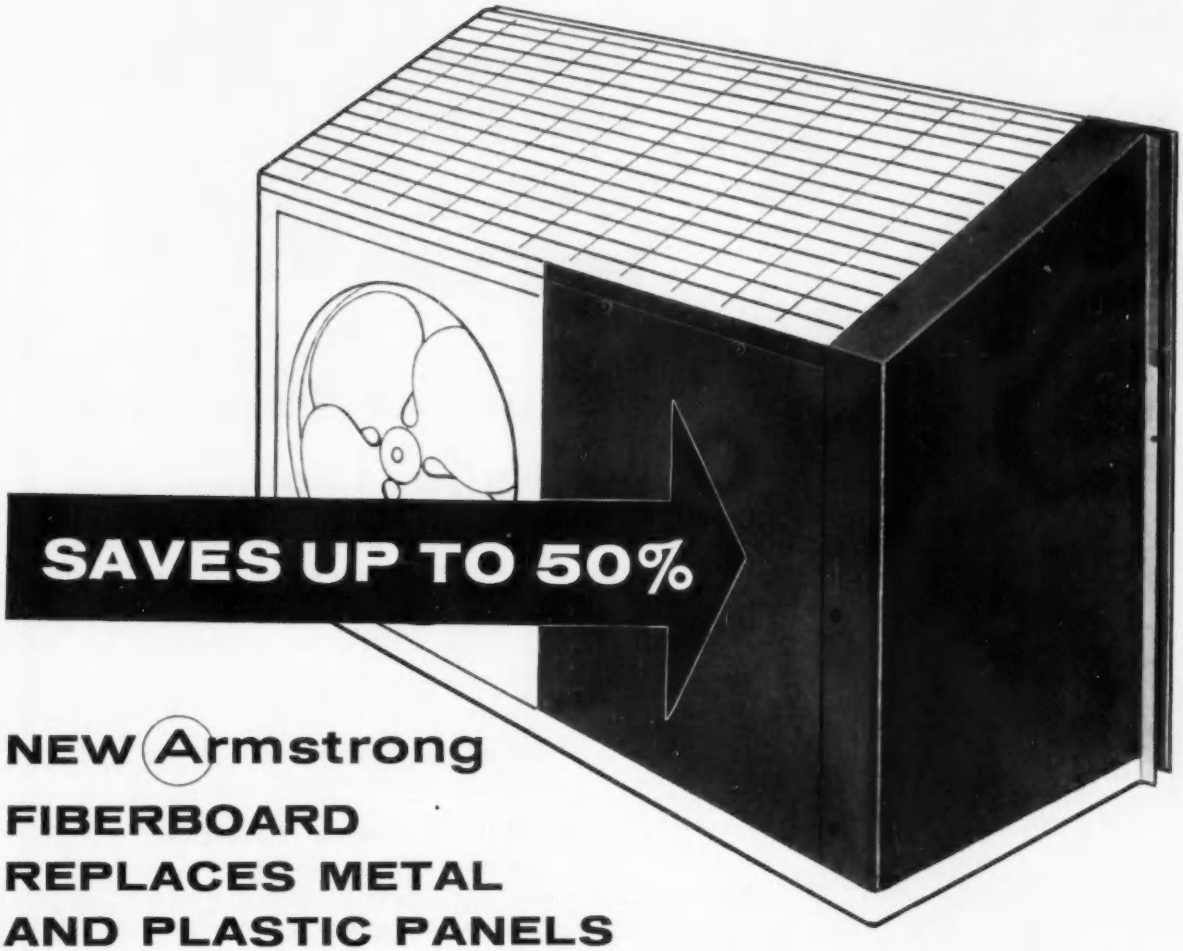
P. R. MALLORY & CO. Inc., INDIANAPOLIS 6, INDIANA



NEW Armstrong FIBERBOARD REPLACES METAL AND PLASTIC PANELS

Seven leading air-conditioning manufacturers are chopping costs on non-structural panels by substituting new Armstrong Fiberboard for steel and plastic parts. Maybe Fiberboard can save money for you, too.

Here's why Armstrong Fiberboard reduces costs with no sacrifice in product performance:

Costs less/sq. ft. Fiberboard costs under 6¢/sq. ft.; steel for comparable service costs about 19¢/sq. ft.

Easy to fabricate. Inexpensive steel rule dies cut, notch, and punch Armstrong Fiberboard accurately. Scoring permits bending at 90° angle. We supply it in sheets or in parts cut to your specifications.

Lightweight. Weighs about 1/6 as much as comparable steel panels it replaces.

Resists moisture. Special saturant keeps Fiberboard strong, rigid, and dimensionally stable under high humidity, at temperatures up to 175° F.

Odorless. Can't taint food, as in a refrigerator.

Resists fungus attack. Lever Bros. gives Fiberboard a mold growth rating of 000-012. It's the only known material of its kind to pass this test.

Caliper. Standard thickness, .038 inch; also in 2-, 3-, and 4-ply laminations.

See how Fiberboard can cut costs in your product. Mail the coupon today. Armstrong Cork Company, Industrial Division, Lancaster, Penna.

Armstrong FIBERBOARD
Low-cost non-structural panels

Armstrong Cork Company
8611 Imperial Avenue
Lancaster, Pa.

I wish to know more about Fiberboard for possible use in

_____
(kind of application)

- ☐ Have representative call
- ☐ Send samples
- ☐ Send booklet on Fiberboard and other Armstrong felt and fibrous products

Name _____
Title _____
Company _____
Address _____

International

Diamond T

The BIG JOBS count on Thompson linkage, too

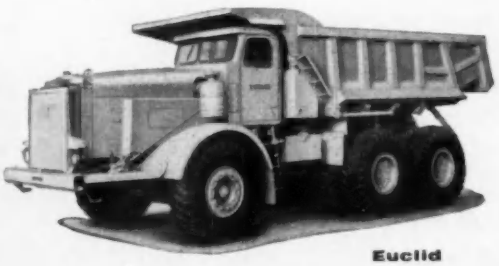
Caterpillar

STEERING linkage, engineered and manufactured by Thompson Products' Michigan Division, isn't only used on leading passenger cars. Heavy duty vehicle manufacturers count on Thompson too, as you can see from some of the big jobs above. All of them are equipped with Thompson chassis parts.

Thompson is continually being called upon by the automobile, truck, farm machinery and off-the-road vehicle manufacturers to come up with new ideas and new manufacturing. Why don't you call or write Thompson's Michigan Division now for help with your problems. The address is 34201 Van Dyke, Warren, Michigan; the telephone number Jefferson 9-5500.

Mack

Four Wheel Drive



Euclid

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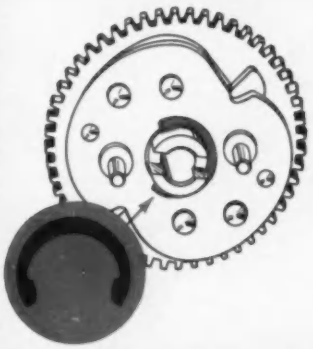
Thompson Products

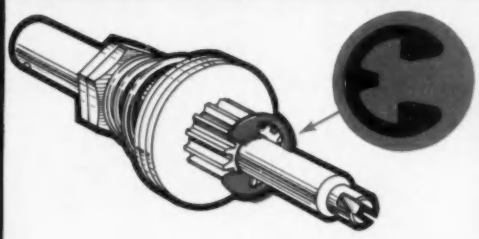
Michigan Division: Warren and Portland

Waldes Truarc Rings speed assembly, facilitate maintenance, improve performance of new automatic calculator

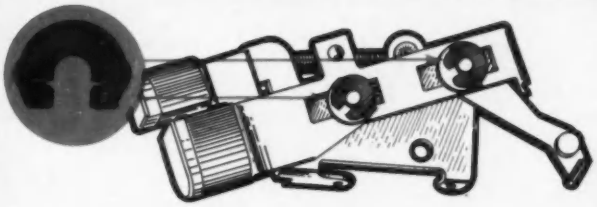
THE NEW MARCHANT DECI•MAGIC
automatic-decimals calculator made by Marchant Calculators, Inc., Oakland, California.



CRESCENT RING SPEEDS ASSEMBLY, DISASSEMBLY
Main clutch utilizes radially-installed series 5103 crescent ring for rapid assembly and disassembly. Ring's low protruding shoulder provides necessary clearance between ring and the two studs. The main clutch operates each time a Deci-Magic control key is depressed.



E-RING SECURES PARTS AGAINST SPRING THRUST. Slip clutch assembly uses Truarc series 5133 E-ring to hold parts on shaft. Functioning of the assembly is dependent upon the ring's ability to withstand thrust exerted by the heavy barrel spring.



LOCKING PRONG RINGS PERMIT SIMPLE DESIGN. Shift slide assembly uses two Truarc series 5139 bowed locking prong rings to lock the parts together in a sliding fit. Precise amount of spring tension prevents objectionable wobble and noise, permits the key to slide smoothly in operation. Easy radial assembly and disassembly of rings facilitates field maintenance and repair. Alternative construction would have required cut washer, spring washer and hairpin-type spring clip on each stud.

Whatever you make, there's a Waldes Truarc Ring designed to save you material, machining and labor costs, and to improve the functioning of your product.

In Truarc, you get

Complete Selection: 36 functionally different types. As many as 97 standard sizes within a ring type. 5 metal specifications and 14 different finishes. All types available quickly from leading OEM distributors in 90 stocking points throughout the U.S. and Canada.

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Design and Engineering Service not only helps you select the proper type of ring for your purpose, but also helps you use it most efficiently. Send us your blueprints today...let our Truarc engineers help you solve design, assembly and production problems...without obligation.

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Please send new, descriptive catalog showing all types of Truarc rings and representative case history applications. *(Please print)*

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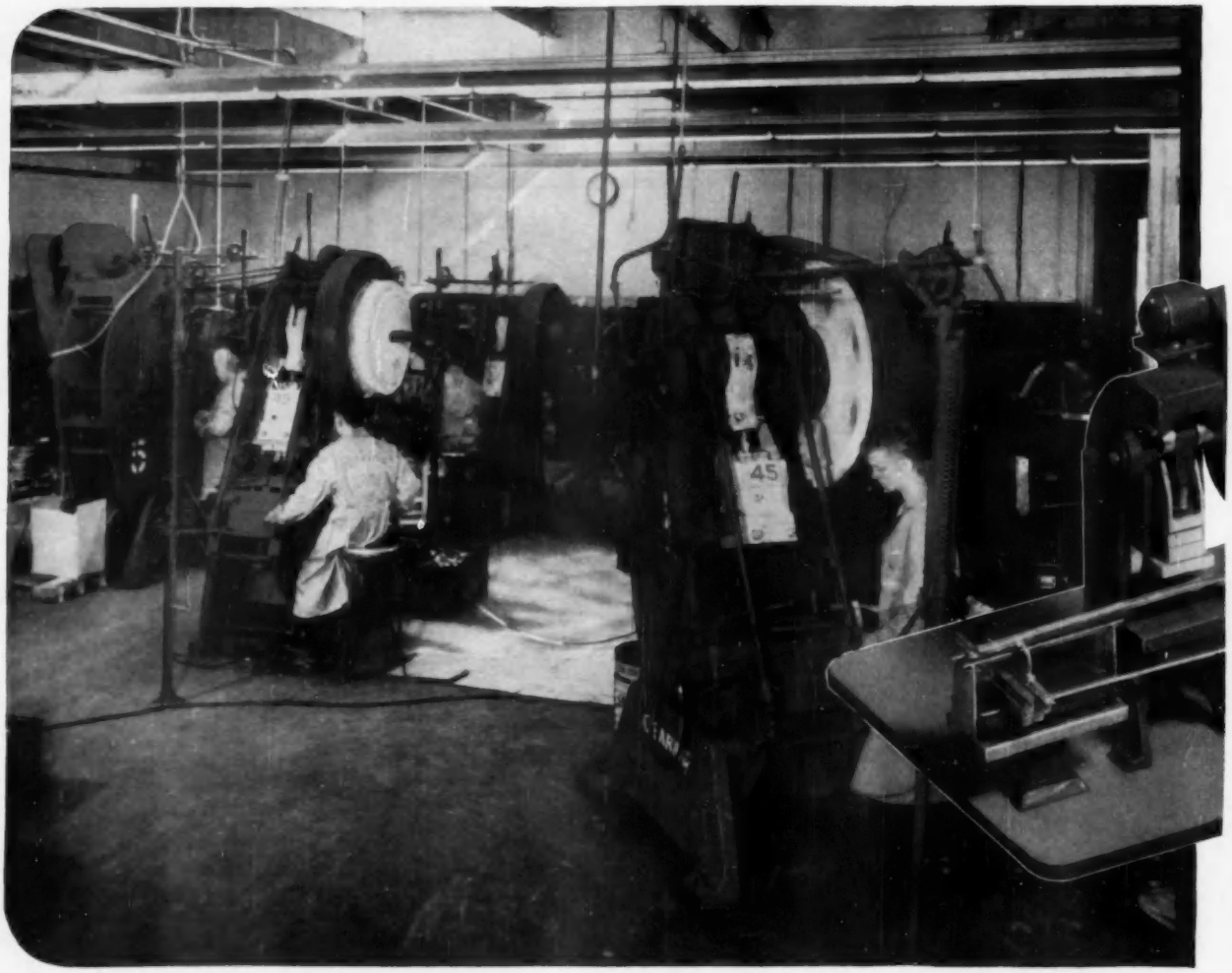
City ..... *Zone* ..... *State* ..... AY 119

WALDES TRUARC Retaining Rings, Grooving Tools, Pliers, Applicators and Dispensers are protected by one or more of the following U.S. Patents: 2,382,948; 2,411,426; 2,411,761; 2,416,852; 2,420,921; 2,428,341; 2,439,785; 2,441,846; 2,455,165; 2,483,379; 2,483,380; 2,483,383; 2,487,802; 2,487,803; 2,491,306; 2,491,310; 2,509,081; 2,544,631; 2,546,616; 2,547,263; 2,558,704; 2,574,034; 2,577,319; 2,595,787, and other U.S. Patents pending. Equal patent protection established in foreign countries.



Here's Another Clearing TRANSFLEX idea that

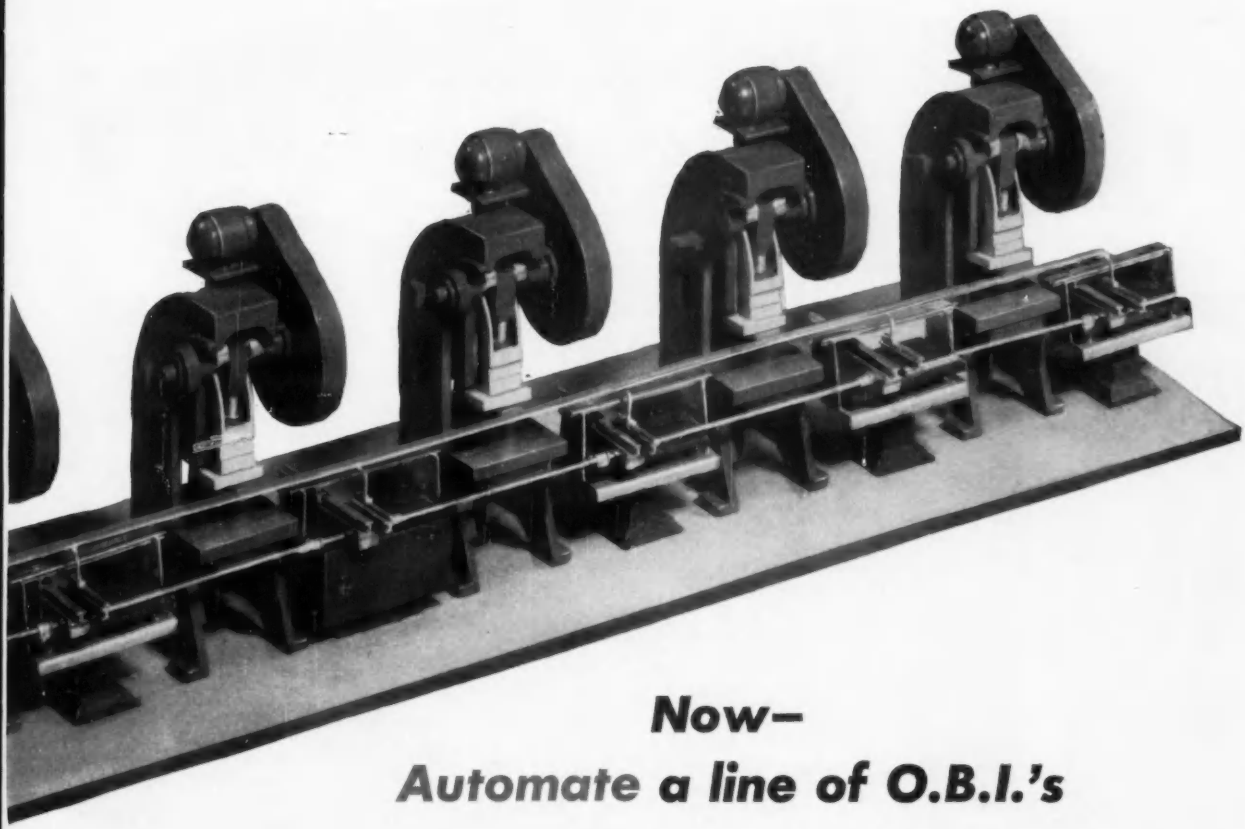
Did you ever think of the productive possibilities of turning a group of O.B.I.'s into a speedy, automatic transfer machine? That's exactly what Clearing has done in the new O.B.I. transflex setup. As few as two or as many as seven or eight O.B.I.'s can be unified into a single automated group.

What's more, Clearing's Transflex feed is completely flexible, fully adaptable to take on parts of varying size. Finish one job, and you can reorganize the line to fit the requirements of the next run. Then if the work load in your shop changes completely, you can use the machines independently of each other, or in groups of two or three as the work demands.

CLEARING

CLEARING MACHINE CORPORATION

6499 W. 65th STREET • CHICAGO 38, ILLINOIS



Now—
Automate a line of O.B.I.'s

with CLEARING O.B.I. TRANSFLEX

can bring automation to every stamping shop.

O.B.I. Transflex is a husky, carefully designed piece of equipment. In spite of its versatility, it's as rugged as any feeding equipment you can find.

This Clearing Transflex idea can be a life saver for cutting manufacturing costs of your product. Or, if you have a job shop you can really be competitive in quoting long run jobs. That's right, O.B.I. transflex is flexible enough for a job shop. And it doesn't tie up a lot of capital in single purpose equipment.

Want to get specific about this new Clearing Transflex idea? Just tear out this page and send it to Clearing. We'll send this bulletin on ***O.B.I. Transflex*** *right away.*

PRESSES the way to efficient mass production

division of **U.S. INDUSTRIES, INC.**

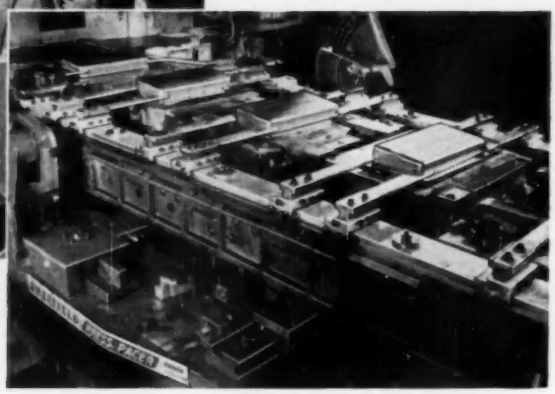
HAMILTON DIVISION, HAMILTON, OHIO

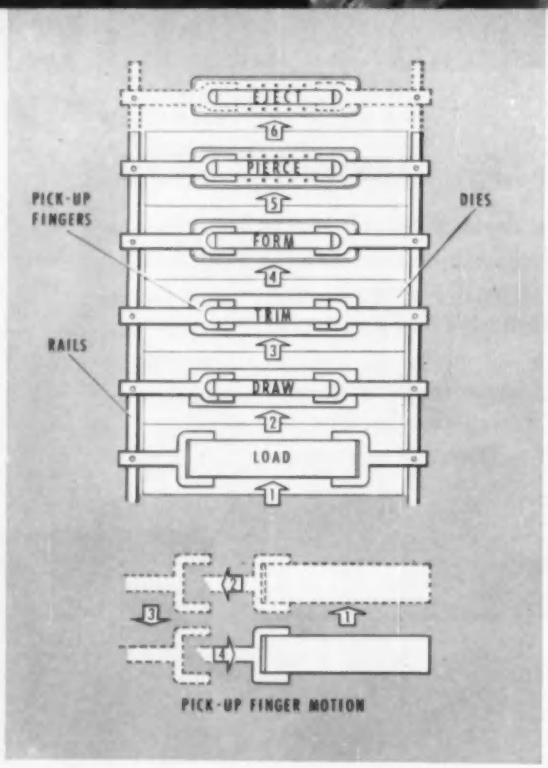
USI

CMC CLEARING

AUTOMATE YOUR PRESS

Automobile oil pan produced from coil stock in six operations on straight side press. Press Pacer automatically transfers stampings from each die station to the next.





The Sheffield Press Pacer is a demountable mechanical transfer device which automates the straight side press while permitting its quick reconversion to conventional operation. It moves stampings from one die position to the next with each stroke of the ram—or from one press to the next.

The Press Pacer is completely mechanical in operation. It is driven by means of a lever arm bolted to the ram. The press so equipped may be fed from front to back or from right to left—loaded and unloaded either automatically or manually.

In a typical installation the Press Pacer enabled one press to handle three times the production previously turned out by six presses. In addition it eliminated work damage caused by moving parts from press to press.

WITHOUT RESTRICTING ITS USE TO ONE PRODUCT BY MEANS OF THE

SHEFFIELD *PRESS PACER

Press Pacer automatically moves these torque tube flange stampings through 6 die stations on this large press.

COMPLETE FLEXIBILITY

The Press Pacer can be installed in a few hours. If any emergency makes manual feeding imperative, the Press Pacer may be demounted within minutes and the press operated in conventional fashion.

The Standard Press Pacer is built for presses with a bed area of 42" x 72" **or larger,** and a shut height of 14" **or more**—special units for smaller and larger presses.

Feed distance between dies for the **standard** unit may be varied between 8" and 36". Stroke adjustment has a range of 12".

Feed fingers and other elements may be readily revised to accommodate product changes.

Before deciding on a change in your press equipment, find out how much a Press Pacer would save you.

Send your part prints, press information and production requirements to ***The Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 4.***

*Trade-Mark

the SHEFFIELD corporation

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compact . . . power-packed

New General Electric

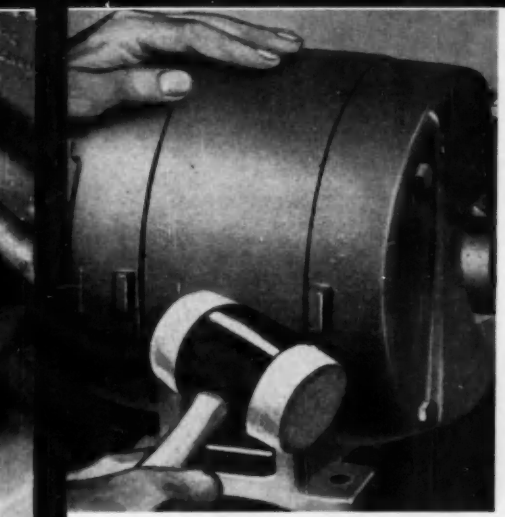
NOW EASIER

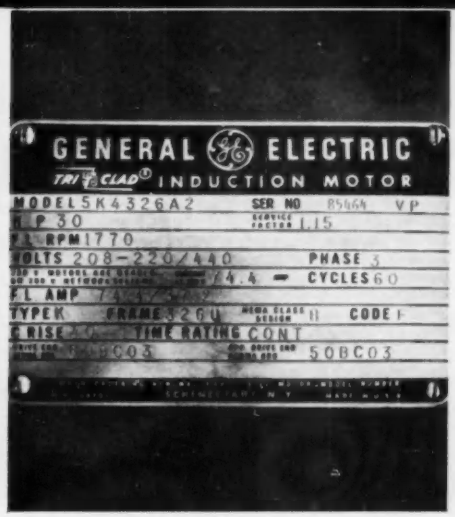
COMPLETE LINE AVAILABLE

TRI 55 CLAD Motors are . . .

TO MAINTAIN

THROUGH 125-HORSEPOWER





FAST END-SHIELD REMOVAL is possible because of Tri-Clad '55' motor's rugged knock-off lugs. Remove four bolts, tap on knock-off lugs and end-shield is off to permit easy repositioning or quick motor inspection.

EASIER TO MAINTAIN, Tri-Clad '55' motors utilize a stainless-steel, non-corrosive nameplate to give complete rating information including AFMBA bearing numbers. Separate steel plate gives connection diagrams.

EASIER TO INSTALL, Tri-Clad '55' motors use Perma-numbered leads to simplify wiring, speed motor hook-up. Numbers are stamped on terminals and printed on every half-inch of Geoprene® leads.

immediate shipment . . . all ratings

The need for faster production schedules and reduced production costs has made motor maintenance of prime concern to motor users. Modern motors must be easy to inspect and maintain without loss of production time due to routine maintenance.

TO MEET THIS NEED, G-E Tri-Clad '55' motors feature an oversize grease reservoir which contains enough grease for normal 5-year operation. Yet, new grease can be added while the motor is running. Other easy maintenance features are described above.

EASE OF MAINTENANCE, however, is not the whole Tri-Clad '55' motor story. Experienced G-E motor engineers have used revolutionary materials and the most modern production and testing facilities to provide a motor that is not only easier to maintain, but also more reliable and easier to install.

Formerly available only to 30-hp, these proven Tri-Clad '55' motors are now available for immediate shipment—usually from nearby warehouse stocks—up through 125-hp.

FOR FULL INFORMATION on the complete Tri-Clad '55' motor line contact your nearest G-E Apparatus Sales Office or Distributor.

Section D891-7
GENERAL ELECTRIC COMPANY
Schenectady 5, New York

Please send me the following publications:

☐ **FREE BULLETIN (GEA-6602) describes advanced features of new Tri-Clad '55' motors through 125-hp.**

☐ **FREE SLIDE RULE (GEN-148) to determine weight and space-saving benefits of new Tri-Clad '55' motors.**

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TITLE _____

COMPANY _____

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Progress Is Our Most Important Product

GENERAL ELECTRIC

There's no substitute for the FORGED crankshaft

Crankshaft forgings illustrated, left to right, for V-8 passenger car, diesel truck and heavy tractor engines

Crankshafts have been made successfully by other methods of fabrication and have proven to be *good enough* for certain non-critical applications — but for maximum dependability of the modern, compact, high compression, high torque engine a forged crankshaft is essential.

The forging process assures, to the greatest degree possible, uniformity and predictability of physical properties with a minimum variance from piece to piece or from one location to another in the same piece.

Wyman-Gordon has been forging crankshafts since the beginning of the internal combustion engine era and today produces more crankshafts for a greater variety of applications than any other company in the world. In a crankshaft there is no substitute for a forging, and in a forging there is no substitute for Wyman-Gordon quality and experience.

WYMAN-GORDON COMPANY

Established 1883

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FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM

ENTER THIS CONTEST ...90 CASH PRIZES!

CONTEST RULES

1. Tell in 25 words or less "Why I prefer Albanene tracing paper."
2. Send all entries to K&E Albanene Contest, Box 160, New York 46, N. Y. Enter as often as you wish. There is nothing to buy.
3. Entries must be postmarked not later than midnight, Nov. 30, 1957.
4. Entries become the property of Keuffel & Esser Co. None can be returned.
5. The decision of the judges is final.
6. Winners will be notified by mail. A complete list of winners will be sent upon request, providing request is accompanied by stamped, self-addressed envelope.
7. Contest is open to all residents of continental United States, except employes, and their immediate families, of Keuffel & Esser Co. and its subsidiaries and dealers; its advertising agency; and judges of this contest.
8. Also not applicable to residents of those states where there are prohibitory laws.

Why I prefer **ALBANENE**® Tracing Paper...

First prize $1500
Second prize $1000
Third prize . . . . . $ 500

plus 87 prizes of $25 each!

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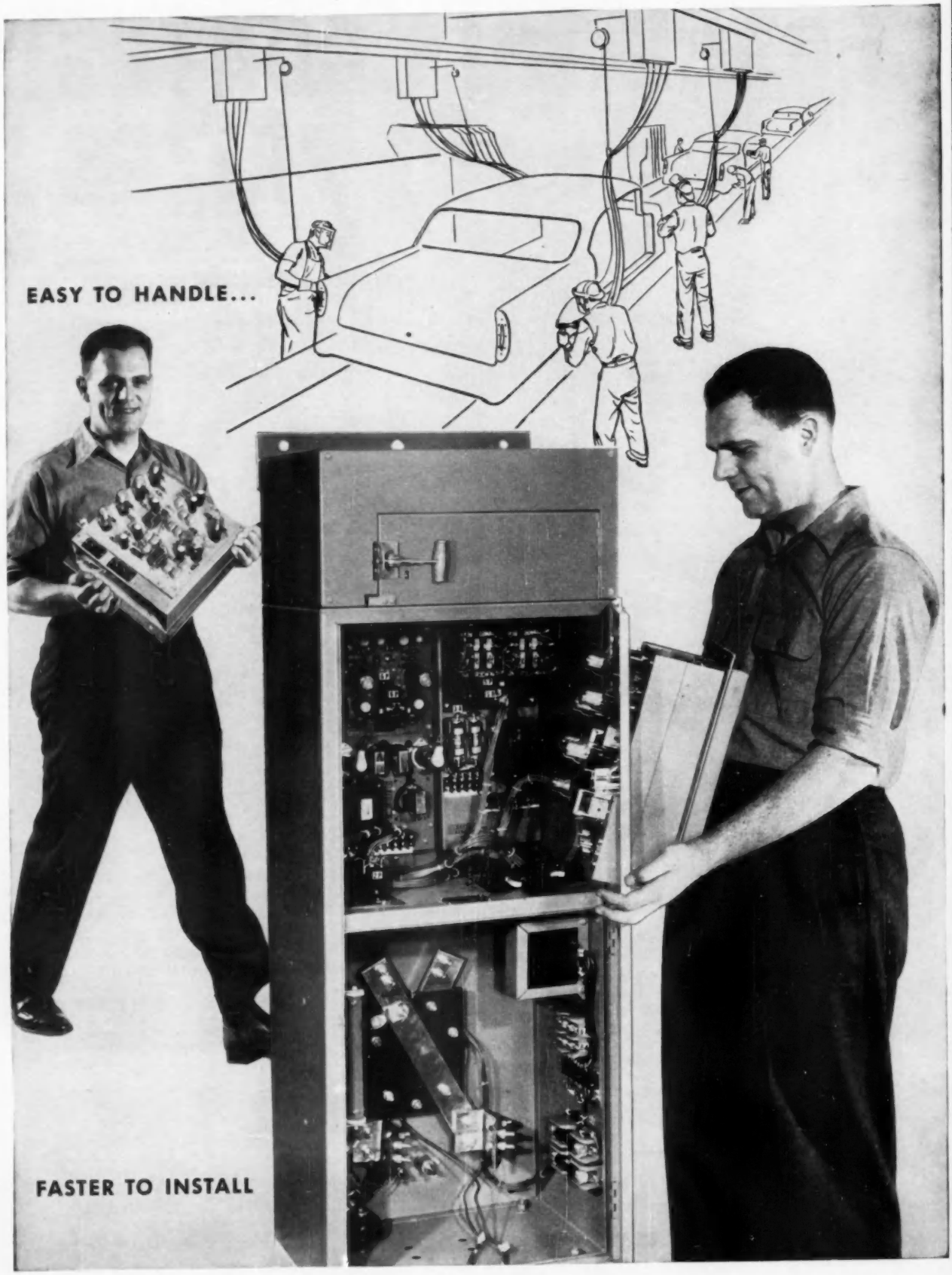
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Westinghouse Weld-O-Timers with plug-in panels keep down-time down

Plug-in replacement of Westinghouse Weld-O-Timer* control panels cuts down-time, keeps production lines rolling. Three minutes is all it takes for full installation—putting in place and plugging in the weld sequence timer panel, the heat-control panel and the relays.

New printed-circuit construction of both panels reduces weight by 30%... makes panels easier to handle, faster to install. Printed circuits replace 27 feet of wiring in the two panels... positively binding circuits and components.

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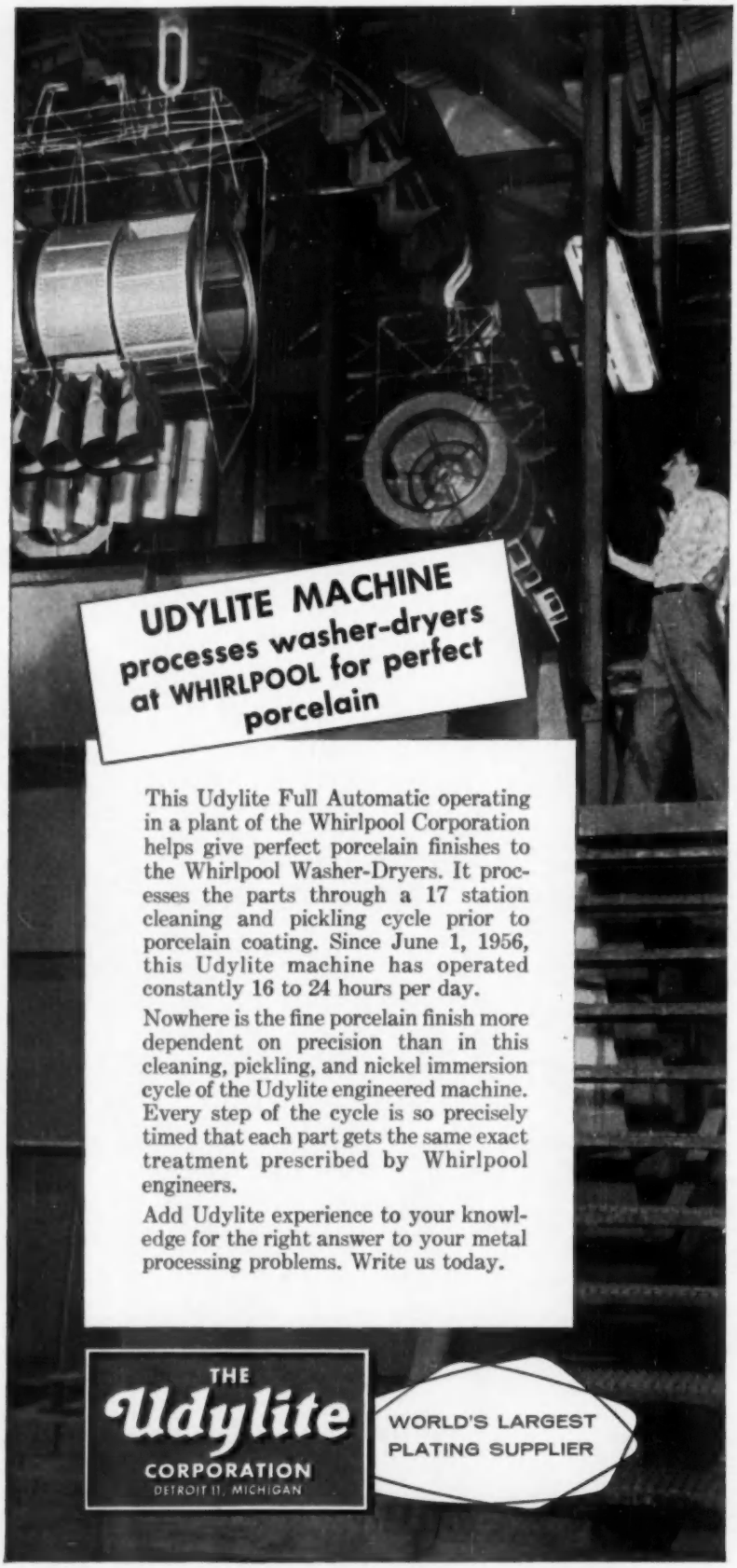
Snap-on Ignitron tube thermostat improves welder efficiency, protects against high operating heat by locking out current in the event of dangerous heat build-up.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processes washer-dryers
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This Udylite Full Automatic operating in a plant of the Whirlpool Corporation helps give perfect porcelain finishes to the Whirlpool Washer-Dryers. It processes the parts through a 17 station cleaning and pickling cycle prior to porcelain coating. Since June 1, 1956, this Udylite machine has operated constantly 16 to 24 hours per day.
Nowhere is the fine porcelain finish more dependent on precision than in this cleaning, pickling, and nickel immersion cycle of the Udylite engineered machine. Every step of the cycle is so precisely timed that each part gets the same exact treatment prescribed by Whirlpool engineers.
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CALENDAR

OF COMING SHOWS AND MEETINGS

International Motor Show, Turin, Italy .....Oct. 30-Nov. 10

National Metals Exposition and Congress and Second World Metallurgical Congress, International Amphitheatre, Chicago, Ill. .....Nov. 2-8

SAE Transportation Meeting, Hotel Statler, Cleveland, O. .....Nov. 4-6

American Institute of Electrical Engineers, ninth annual Machine Tool Conference, Hotel Schroeder, Milwaukee, Wisc. .....Nov. 4-6

SAE Diesel Engine Meeting, Hotel Statler, Cleveland, O. .....Nov. 5-6

SAE Fuels and Lubricants Meeting, Hotel Statler, Cleveland, O...Nov. 6-8

American Petroleum Institute, annual meeting, Conrad Hilton Hotel, Chicago, Ill.....Nov. 11-14

Aircraft Hydraulics Conference, Park Shelton Hotel, Detroit, Mich. .....Nov. 12-13

American Standards Association, annual meeting, St. Francis Hotel, San Francisco, Calif. Nov. 13-15

Air-Conditioning and Refrigeration Exposition, International Amphitheatre, Chicago, Ill....Nov. 18-21

National Industrial Conference Board, general meeting, Hotel Schroeder, Milwaukee, Wis...Nov. 21

ASME Annual Meeting, Hotel Statler, New York, N. Y.....Dec. 1-6

Automotive Electric Association, annual membership meeting, Edgewater Beach Hotel, Chicago, Ill. .....Dec. 8-13

Eastern Joint Computer Conference, Sheraton Park Hotel, Washington, D. C. .....Dec. 9-13

Society of the Plastics Industry Conference, Hotel Commodore, New York, N. Y. .....Dec. 10-11

1958

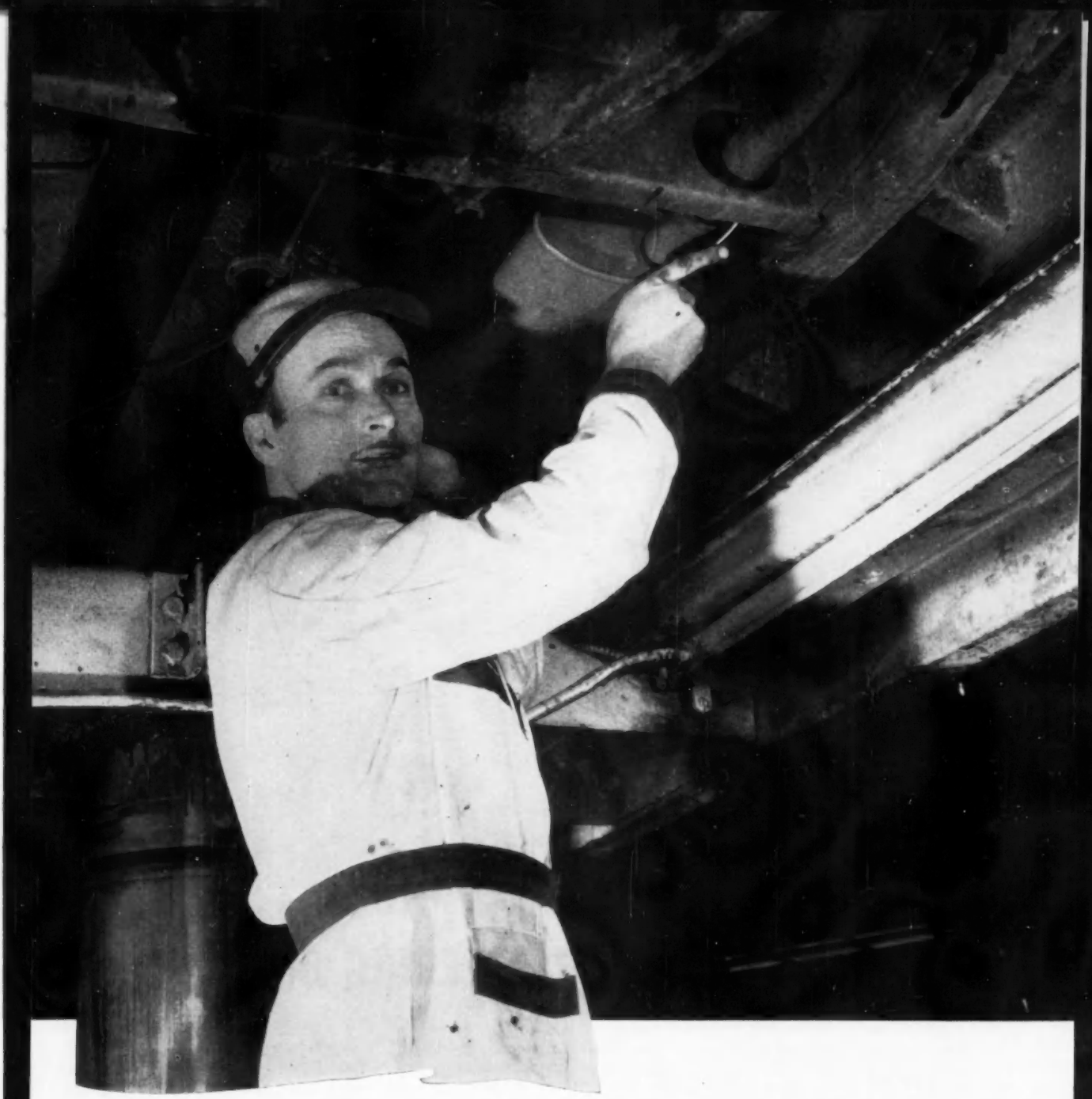
SAE Annual Meeting and Engineering Display, Sheraton-Cadillac and Statler Hotels, Detroit, Mich. .....Jan. 13-17

National Motor Boat Show, Coliseum, New York, N. Y.....Jan. 17-26

Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Ill. .....Jan. 27-30

Instrument Society of America, national conference on chemical and petroleum instrumentation, Wilmington, Del. .....Feb. 3-4

Automotive Accessories Manufacturers of America Exposition, Navy Pier, Chicago, Ill.....Feb. 3-6



"They should make these things of Stainless"

As any motorist knows, exhaust systems on automobiles seem to be the "Achilles Heel" in an otherwise miracle of craftsmanship.

Like the mechanic says, "They should make mufflers and exhaust pipes from Stainless Steel—then they would have something!" And, we might add, something for which the average motorist would gladly pay an extra premium.

High heats for long periods has little deteriorating effect on stainless, and its resistance to the corrosive elements that are a major cause of present day exhaust system failure has long been established.

It seems certain that one day most exhaust systems will be fabricated of stainless steel—and when they are, a good part of the stainless will be from the mills of Sharon—pioneer and prime producer of Stainless Steel for the automotive industry.

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SURE, POWER STEERING MAKES THE JOB EASIER. BUT IT'S THE ADDED SAFETY THAT COUNTS MOST.
OUR POWER-STEERED RIGS STAY ON SCHEDULE BETTER, TOO.
EITHER WAY, POWER STEERING MAKES GOOD BUSINESS SENSE.

THE CASE FOR POWER STEERING ON TRUCKS!

The trend to power steering on trucks is based on one very practical reason —operators of trucks equipped with power steering have invariably found that the added safety and greater operating efficiency of their vehicles have demonstrated that power steering is indeed a sound investment.

Truck drivers using power steering report less tension and fatigue in normal driving and appreciate the positive control that blocks road shock from chuck holes and prevents loss of control if the truck is forced out on a soft shoulder.

The dispatcher knows the importance of regularly maintained schedules. He is quite aware that with power steering drivers are more relaxed and are better drivers than tired drivers. Thus, power steering not only reduces the hazard of road accidents, but helps the driver to maintain established schedules through better vehicle control.

In short, power steering, by saving time and money, contributes materially to a more profitable operation.

Truck manufacturers are always eager to offer their customers features that will make truck operation safer and more profitable and, at the same time, give their dealers every selling advantage.

That's why more and more truck manufacturers are offering performance-proven Bendix* Power Steering as original factory equipment.

If you would like to know why power steering for trucks is perhaps even more logical than power steering for passenger cars, we have prepared an interesting folder on the subject.

Write for your copy today. We think you'll be convinced. *REG. U.S. PAT. OFF.

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Bendix AVIATION CORPORATION

AUTOMOTIVE INDUSTRIES

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STANLEY APPLEBY—*Comptroller*

High Spots of This Issue

▼ More 1958 Car Models Unveiled

With the new model year getting underway, AUTOMOTIVE INDUSTRIES devotes most of this issue to a roundup of new cars. Included are articles on the new Buick (p. 48), Chevrolet (p. 50), De Soto (p. 53), Mercury (p. 54), Oldsmobile (p. 56), Lincoln and Continental (p. 58), Imperial (p. 60), Chrysler (p. 61), Dodge (p. 62), Plymouth (p. 64), and Pontiac (p. 66).

▼ Atomic Instrumentation at Delco-Remy Plant

Delco engineers have solved one of their toughest manufacturing problems with a radioisotope gage that detects and records thickness variations in a rapidly moving sheet of soft rubber. This new method of continuous non-destructive inspection is discussed here. Page 68.

▼ Canada's Automobile Industry

This comprehensive survey of Canada's expanding automobile industry includes news of plant expansions and new production facilities, as well as the latest figures on car production and imports. Page 70.

▼ Improved Arc Welding Methods

Improved arc welding methods at Allison Div. of General Motors have resulted not only in economies—including higher welding rates—but in welds of superior quality. This article tells how parts normally forged are joined by automatic submerged welds. Page 72.

▼ 46 New Product Items And Other High Spots, Such As:

New Dodge trucks; metal show preview; Studebaker's expanded truck line; materials handling; and industry statistics.

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT
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Taking TWO Broaching Cuts

. . . Removes Excessive Stock

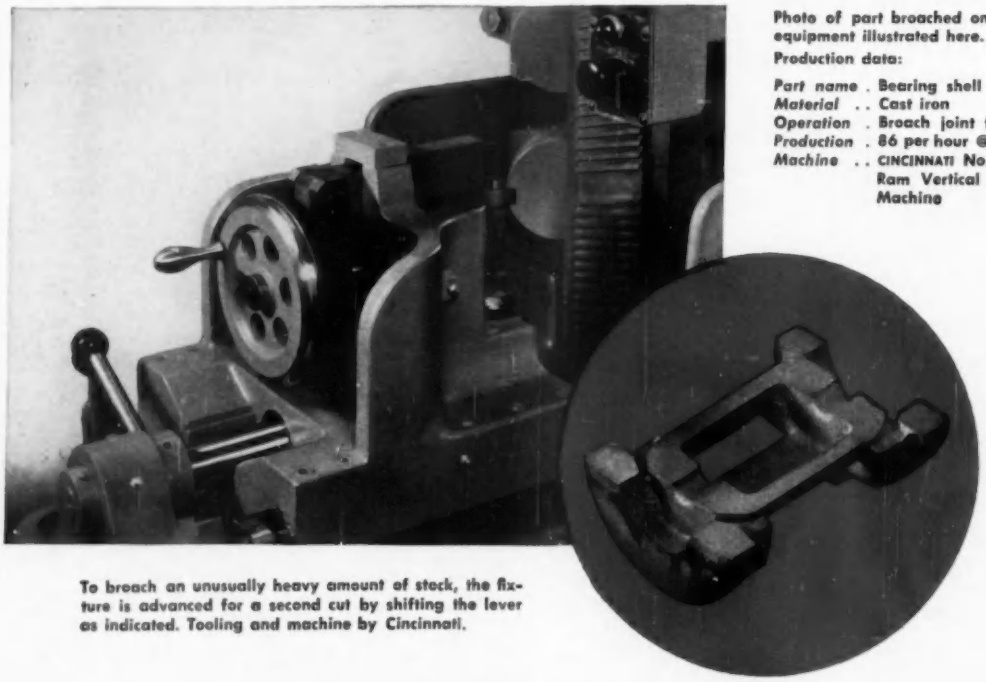
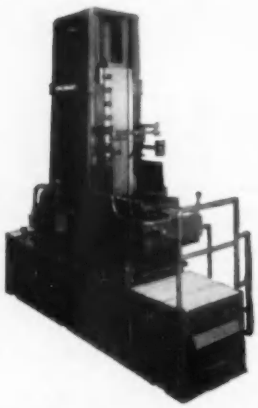


Photo of part broached on the Cincinnati equipment illustrated here.

Production data:

Part name . Bearing shell
Material . . Cast iron
Operation . Broach joint face
Production . 86 per hour @ 85% efficiency
Machine . . CINCINNATI No. 5-42 Single Ram Vertical Broaching Machine

To broach an unusually heavy amount of stock, the fixture is advanced for a second cut by shifting the lever as indicated. Tooling and machine by Cincinnati.



CINCINNATI Single Ram Vertical Hydro-Broach. Catalog No. M-1745-1.

Many heavy stock removal jobs are excellent prospects for *broaching* on comparatively short stroke machines. A job of this type, tooled up by Cincinnati Application Engineers on a CINCINNATI® No. 5-42 Single Ram Vertical Hydro-Broach, is illustrated here. The parts are bearing shells, having about 3/16" stock. In two strokes of the ram the entire amount of stock is removed to a smooth, flat finish. ¶ The fixture is a single station manually operated unit. After the first downward stroke of the ram, the table retracts and the operator advances the fixture by shifting the lever as indicated while the ram returns. Then the table advances and the second cut is taken. ¶ CINCINNATI Vertical Broaching Machines have many advantages for low-cost broaching operations . . . hardened and ground table and ram ways; automatic high pressure lubrication; preset cycle control (safety for the operator). And you can depend upon Cincinnati Engineering Service for the most advanced methods and tooling. It will pay you to talk over your machining problems with our specialists. Meanwhile you may want more information on our Single Ram Broaching Machines (catalog No. M-1745-1) or Duplex Broaching Machines (No. M-1848-1). Brief specifications in Sweet's Machine Tool File.

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Special Machine Tools and Complete Production Lines

News

OF THE AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 117, No. 9 November 1, 1957

First Place and Bigger Share Are Chevrolet's 1958 Goals

Chevrolet Motor Div. is aiming for first place in the passenger car market in 1958 with a larger share of total sales.

Chevrolet general manager E. N. Cole told reporters at the division's 1958 press preview at the GM Proving Grounds that he is confident that public acceptance of the 1958 product will allow Chevrolet to enlarge its market share "appreciably" during the coming year.

For the first eight months of 1957 Chevrolet's penetration was 23.8 per cent, but Mr. Cole pointed out that the September figure was 26.1 per cent. "In 1958," he added, "that figure will be greater."

Chevrolet expects to finish 1957 with a spurt and narrow the present registration gap of some 50,000 cars that separates Chevrolet from Ford.

Mr. Cole joined other GM Division heads in predicting a six-million car year for 1958, although he added that it may go even higher.

A new model at the top of the line—the Impala—will give Chevrolet a broader coverage in 1958. The Impala will come in a convertible and a two-door hardtop.

Also new for 1958 is a V-8 engine with 348 cu in. displacement (largest current engine: 283 cu in.) Air suspension will be optional on all models, and standard suspension will use coil springs on the rear wheels as well as the front. The division is geared to equip about 25 per cent of its cars with air suspension, according to Mr. Cole.

REDSTONE MISSILE IS READIED FOR SHIPMENT

Last minute preparations are being performed on a completed Redstone missile on one of the assembly lines. From this point the giant missile, manufactured by Chrysler Corporation, will be shipped by air to a test site somewhere on the Florida coast. One of the largest missiles to be successfully flown in the western world, the 63-ft-long Redstone is classified as a medium-range weapon. A combination of a self-contained guidance system and terrific speed makes the missile relatively immune to known types of countermeasures.

Romney Expects Profit During Current Quarter

George Romney, president of American Motors, says his company will be operating in the black in the current quarter, three months earlier than anticipated. He attributes the early profit to heavy dealer demand for the 1958 Rambler, which has caused the company to increase automotive production schedules to 612 cars a day, 100 units more than this time last year. Rambler production is slated to reach 769 units daily by the end of the second quarter, March 31.

AMC's last profitable quarter was the three-month period ended June 30, 1955. During the first 10 months of this fiscal year, however, the automotive division has been showing a profit.

Other reasons for the anticipated 1958 profit, according to Mr. Romney, are a reduction of non-manufacturing costs by more than $9.4 million during 1957; increased efficiency at the Wisconsin automobile plants; concentration on advertising and selling one car brand name, Rambler; reduced loss and expenses in the Special Products Div., and greater demand that is foreseen for Rambler cars.

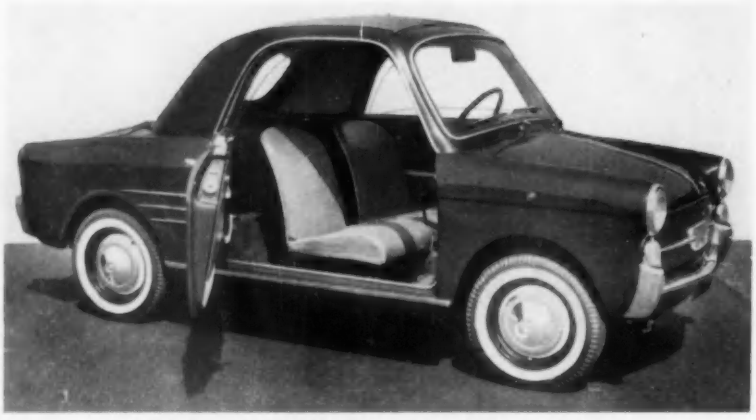
AMC reported 123 new dealers were signed during September to handle Rambler.

New Ford Line Blends Economy With Increased Engine Power

The 1958 Ford passenger car line will offer greater fuel economy and increased engine power and performance, according to Ford Div. spokesmen who addressed the national press preview of the new Ford cars at Detroit last month (Oct.).

Walter J. Cooper, the division's general sales manager, said fuel econ-

News AUTOMOTIVE AND AVIATION



DELUXE BIANCHINA IS BASED ON FIAT 500

Bianchi makes its re-entry into the automobile field with the Bianchina 500, a deluxe version of the air-cooled Fiat 500. Mechanical components and specifications are identical to the Fiat, but the body of the Bianchina has been completely restyled. The two-cylinder, 29 cu in. engine has a 6.5 to 1 compression ratio and develops 13 bhp at 4000 rpm.

omy is made possible by a new "Cruis-O-Matic" automatic transmission with a low axle-ratio (2.69) in overdrive, coupled with a new V-8 engine. The automatic transmission is said to provide up to 15 per cent greater fuel economy.

The new V-8 engine rates at 300 hp with a 362 cu in. displacement and a compression ratio of 10.2 to 1. Uniform compression ratio is attained with a new intake manifold and machined combustion chambers, according to J. O. Wright, Ford Div. general manager. Undoubtedly, a large share of the $185 million that Ford reported it spent to bring out the 1958 line went into the engine program.

Mr. Wright said the relatively large expenditure, on the heels of a $246 million bill in 1957, represents a "major policy change" at Ford. Ford's goal is to improve over 1957 sales with something more than a "facelift" and thus lower the cost-per-unit of the 1958 new car program.

BRITISH RILEY MAKES BOW AT FRANKFURT SHOW

This new British Riley made its first appearance at the recent Frankfurt Show in Germany. Instead of the former four-cylinder 146 cu in. engine, it is powered by the standard OHV Type C BMC 158 cu in. engine with twin carburetors. Compression ratio is 8.3 to 1, and it develops 101 bhp at 4500 rpm. Body modifications include larger rear window and a dished steering wheel. Two pedal control with an automatic Borg-Warner transmission is available.

Mr. Wright said that Ford employment at the start of 1958 production is at an all-time high of more than 200,000. To launch the 1958 car, he added, Ford plants will work overtime during November and December. During the coming year, a new 1.8 million sq ft assembly plant at Lorain, O., will go into operation.

The division should be in a good inventory position for the start of 1958 sales, according to Mr. Wright, with some dealers possibly sold out. He said sale of 1957 model cars will total 1,609,000.

Record Production for 1958 Is Anticipated by Cadillac

Cadillac general manager James M. Roche believes its 1958 cars will capture about one-half of the luxury car market during 1958 and set a new production record for the division. Speaking at the national press preview of the 1958 Cadillacs in Detroit, Mr. Roche said that the luxury car market should hit 290,000 or 300,000 units during the coming year, and Cadillac production should total 150,000 to 155,000 cars. In 1955, Cadillac built 152,583 cars.

For the first nine months of the current year, the division turned out 120,823 cars, highest in history for that period. A year ago it was only 114,993 units. Cadillac's model run ended Sept. 20 with 146,800 cars.

Mr. Roche said that Cadillac sold 47.5 percent of the market in its own price class during the first eight months of 1956. Sales for the first nine months totaled 115,022, slightly higher than last year; but he anticipates a stronger finish in 1957.

With the beginning of 1958 production, Cadillac launched stamping operations at the old Hudson Gratiot plant in Detroit. One million sq ft of floor space was thus added to the division manufacturing facilities.

Claim 235 Big Three Dealers Have Signed to Sell Ramblers

American Motors president George Rommey says 235 Big Three dealers have been signed during the last five months to sell AMC's Rambler. Many of these are small town dealers, but the company says it also has been signing some key metropolitan area dealers in recent months. Not all of the franchises, however, link Rambler to the Big Three brand—in many instances, the owner of the dealership has opened on a new location to handle Rambler.

Lincoln and Mercury 1958 Cars Offer 400-HP Engine as Option

Lincoln and Mercury Div. is offering a 400-hp engine as optional on all 1958 Lincoln, Continental and Mercury cars. The standard Lincoln and Continental engines are rated at 375 hp, while the Mercury engines range from 312 hp to 360 hp. Compression ratio is 10.5 to 1. The 400-hp engine is equipped with three two-barrel carburetors.

Details of the new engines were revealed by James J. Nance, Ford Motor Co. vice-president and general manager of the new Lincoln and Mercury Div., at a press preview of the 1958 line in Detroit. He said that the new engine development cost the division $39 million. The total expenditure for the new Lincoln and Continental cars and the changes in the Mercury line was $231 million, but a large share of this went for the new Lincoln plant at Novi, Mich., and the Mercury plant at Los Angeles.

New to the Mercury line is the 220.2 in. Park Lane series at the top of the line, aimed at the Oldsmobile 98 and Buick Roadmaster price group. The Park Lane (phaeton coupe, phaeton sedan and convertible) is built on a 125 in. wheelbase.

Lincoln and Continental Mark III share the same unitized body, which gives more interior room for passengers. In styling, the Lincoln models follow the Mark III lines.

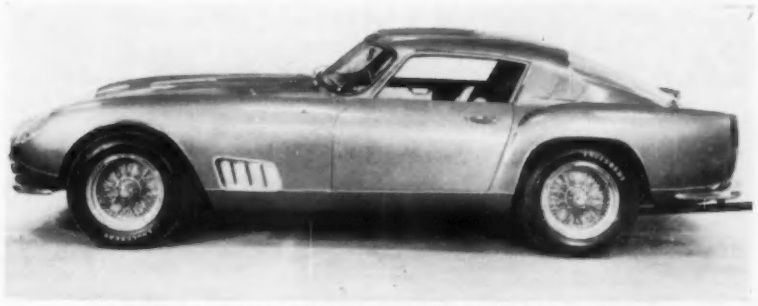
Mr. Nance said that Mercury will concentrate heavily on station wagon business in 1958, with a full line of hardtop wagons. He said Mercury's station wagon sales during the first nine months of 1957 ran 40 per cent higher than the entire calendar year of 1956.

New 4-Passenger Thunderbird To Have More Length and Beam

Ford Div. is currently planning to introduce the new four-passenger Thunderbird sometime after Jan. 1. Production of the current model will end this month.

The 1958 Thunderbird will be built at the Lincoln and Mercury Div. plant at Novi, Mich. It will have a wheelbase of 113 in., overall length of 205.4 in., and width of 75.4 in. The new car will measure 23 in. longer and 5 in. wider than the 1957 two-passenger model.

Ford Div. reports that the 1957 Thunderbird will have achieved a sales total of 53,000 for its three-year run, when present plans are completed.



FERRARI BUILDS NEW SPORTS CAR FOR 1958

The two-passenger Ferrari Gran Turismo for 1958, with a new coupe body by Scaglietti, is now being built as a sports car. It is built on a 103-in. wheelbase, and is powered by a V-12, 180 cu in. engine that develops 240 bhp at 7000 rpm. Compression ratio is 8.5 to 1.

Missile Expert Advocates Use of Pneumatic Control

A high-pressure pneumatic system for storing energy can be used to control a huge guided missile in flight outside the earth's atmosphere, according to Leonard L. Baker, managing engineer of the mechanical laboratory at Chrysler Corp. Missile Operations. Baker spoke at the National Conference on Industrial Hydraulics, held in Chicago recently. The conference is sponsored by Illinois Institute of Technology and its affiliate, Armour Research Foundation.

Baker said that a few pounds of pneumatic thrust from an air nozzle in space is all that is needed to control and orient a huge missile in flight.

He cited the Chrysler missile—the Redstone—as an example of the use of pneumatic control and stated that many manufacturers are holding practically exclusive rights in the field by default alone. Missile manufacturers, he said, would be "particularly pleased" to have their development burden reduced by further improvements in these applications.

Checker Cab Targets March 1 For Production of New Car

Checker Cab Mfg. Co. of Kalamazoo, Mich. has set March 1, 1958 as the target date to begin manufacture of a new family automobile (see AI, Dec. 1, 1955, p. 48).

The four-door sedan, built on a 120-in. wheelbase and measuring 200 in. overall, will be constructed basically the same as the company's commercial taxi cabs. Styling and trim, however, will make it distinctive, according to Checker.

The company reportedly will spend some $5 million in tooling and plant expansion to bring out the passenger car, which will be powered by a six-cylinder Continental engine. The car will sell for about $2500 at the factory and will include automatic transmission and power assists. No dealer organization is being planned.

JAPANESE CAR EXHIBITED AT PARIS AUTOMOBILE SHOW

The Prince Skyline, built by Fuji Precision Machinery Co., Ltd. of Tokyo, is a six passenger, four-door sedan. The car has a 99.8-in. wheelbase, overall length of 168.5 in. and roofline height of 60.5 in. It is powered by a four-cylinder, 90.6 cu in. overhead valve engine with a compression ratio of 7.5 to 1 and develops 60 bhp at 4400 rpm. The car was exhibited at the recent Paris Automobile Show.

NEWS AUTOMOTIVE AND AVIATION

NEW PIPER APACHE CARRIES GREATER PAYLOAD

The new Piper Apache for 1958, improved version of the popular executive twin, is powered by two 160 hp Lycoming 0-320-B engines. Higher compression ratio of the four-cylinder engine results in more efficient fuel consumption and greater gasoline economy. Cruising speed has been stepped up to over 170 mph at 7,000 ft and gross weight increased from 3,500 to 3,800 lb, resulting in a net increase in payload of 250 lb. Apache seating provisions, in four and five-passenger configurations, are greatly improved.

Pontiac Aims for Fifth Place With 8 Per Cent of '58 Sales

Pontiac Div. expects to sell 8 per cent of a six-million car market in 1958 and take fifth place away from Oldsmobile, according to Semon E. Knudson, GM vice president and Pontiac general manager. To accomplish this, Pontiac is banking heavily on its restyled body, engineering changes, and high sales volume in the low-priced Chieftain series.

Speaking at the national press preview of the 1958 line last month (Oct.), Mr. Knudson indicated that a tight battle is in the offing among GM's middle-price three: Pontiac, Oldsmobile and Buick. All three divisions have predicted 1958 sales of 450,000-480,000 cars.

Eight per cent of the six million prediction (480,000) cars would put Pontiac well ahead of its anticipated 1957 total of 358,000 units. Mr. Knudson told reporters that Pontiac currently is running ahead of last year's production, and plans to build 95,000 of its 1958 models before the end of the calendar year. As of October 12, production was 262,844 units, with full production coming the following week.

Pontiac has added two models for 1958—the Chieftain convertible in the lower end and the Bonneville Sports Coupe at the top of the line. Among engineering changes are greater engine displacement (370 cu in.), a new X-type frame and two features optional on all models—air suspension and fuel injection. The new body is 4½ in. lower than the 1957 Pontiac and has new treatment of side panels, rear deck and front end.

GE to Multiply Output Of Industrial Diamonds

General Electric Co's metallurgical Products Dept., which has already produced some 100,000 carats of industrial diamonds, expects to be making diamonds at the rate of 3.5 million carats a year by the end of 1958. This would be enough to supply half of the nation's needs in the grinding diamond field, 60 to 600 mesh size.

GE officials revealed at a press meeting in Detroit last month (Oct.) that the Metallurgical Products Dept. has been producing in a pilot plant in Detroit and expects to expand its manufacturing facilities within the coming year.

Kenneth R. Beardslee, general manager of the Metallurgical Products Dept. said that GE has not yet found a way to make diamonds large enough for cutting tools, but that the possibility of bonding is being studied. Application is chiefly for sharpening cemented tungsten carbide cutters.

GE makes its diamonds in a few minutes time by subjecting a carbonaceous material to extreme pressures (more than 1.5 million psi) at temperatures above 5000 F. Similar work reportedly is being done in Sweden.

ALFA ROMEO SPYDER IS AIMED AT U.S. MARKET

The Alfa Romeo Spyder, which has been made available primarily for the U. S. market, has an 87 in. wheelbase and is powered by a four-cylinder, 79 cu in. engine with a compression ratio of 9.5 to 1 and bhp rating of 90 at 6000 rpm.

TEST CYLINDER

Engineers check the bell-mouth cylinder in which a General Electric CJ-805-3 turbojet engine for the commercial airliner, Convair 880, will be tested for de-icing efficiency. The engine will be installed in the cylinder and faced into winds that howl across a mountain top at 175 miles an hour. Water sprayed into the engine through the cylinder's bell mouth will simulate icing conditions. The stand was constructed for Convair by the Rohr Aircraft Co.

Northrop Awarded $20 Million In Contracts for Hawk Missile

Contracts for about $20 million have been awarded to Northrop Aircraft, Inc., major subcontractor to Raytheon Mfg. Co., for work on the Army's Hawk ground-to-air missile system.

The contracts are for research, development, and manufacture of Hawk airframe components and weapon system support equipment, according to Whitley C. Collins, Northrop president.

Manufacture of the Northrop portions of the Hawk missile is under way at the company's Anaheim, Cal., facility. Engineering work is being performed at both the company's Anaheim and Hawthorne installations.

Air Suspension May Precede Wider Use of Compressed Air

Adoption of air suspension by the automobile industry may lead to further uses of compressed air in cars, to take advantage of the compressor.

Stephen Johnson, Jr., general manager of Bendix-Westinghouse Automotive Air Brake Co., predicts that 1959 will see the introduction of air-hydraulic brakes and air windshield wipers that now are used on trucks and buses. Other possibilities include pneumatic window lifts, air horns, engine starters, seat positioners, tire inflation system and jacks.

AI TABLOID

InterAct, a new joining material developed by Intertectics, Inc., forms a permanent chemical union among a broad list of metals in the non-ferrous category, as well as some types of steels. The company says the joint created through chemical ion exchange in most cases is stronger than the metals involved.

* * *

Britain's aircraft industry continues its upward trend, with employment now standing at 260,000 up, five per cent over last year, and the rate of aviation exports comfortably topping the previous record figure of just over $280 million.

* * *

Arwood Precision Casting Corp. reports that it has developed new investment casting techniques that not only add strength and ductility to aluminum investment castings, but also permit the casting of shapes which previously had to be machined or forged.

* * *

International Nickel Co. has established a Chair in Chemical Metallurgy at Columbia University, which is endowed by a grant of $350,000. In addition to the basic grant, the company made a gift of $75,000 for special expenditures incidental to establishment of the Chair.

* * *

Solar Aircraft Co. has licensed Swedlow Plastics Co. to manufacture and sell its resistance-welded stainless steel honeycomb core in the U. S. and Canada.

* * *

National Bureau of Standards engineers say that they have made permanent magnets as small in diameter as a human hair from Cunife, an alloy of approximately 60 per cent copper, 20 per cent nickel, and 20 per cent iron with an unusual combination of magnetic and mechanical properties.

* * *

A new nylon resin, which may have promising applications in the automotive and electrical fields, has been developed by du Pont Co. Called "Zytel" 37X nylon resin, the new material is said to combine mechanical toughness with outstanding resistance to heat and weathering.

Atomic energy in the form of beta rays from a radioscope gage is being used by Delco-Remy Div. of General Motors to assure uniform thickness of microporous rubber separators for Delco batteries. Delco engineers say that such uniformity improves the electrical characteristics of the separators and results in higher terminal voltages.

* * *

Development of a practicable process for extending the nation's supply of uranium by upgrading low-content ores has won for Vanadium Corp. of America one of the 14th Chemical Engineering Achievement Awards.

* * *

Bendix Aviation Corp. has purchased the entire stock interest of the National-Standard Co. in Poroloy Equipment, Inc., of Van Nuys, Calif.

* * *

Kaiser Aluminum & Chemical Corp. has placed an order with Hydraulic G.M.B.H. of Duisburg, Germany, for construction of a 30-million-lb plate stretcher that will be capable of gripping the ends of a 60-ft-long plate of high-strength aluminum alloy for aircraft construction and literally lengthening it as much as 5 ft.

* * *

The Industrial Wire Cloth Products Corp. of Wayne, Mich., wholly owned subsidiary of Purolator Products, Inc., has dropped its old name and will be known henceforth as the Wayne Div. of Purolator Products, Inc.

* * *

Standard Pressed Steel Co. has acquired all assets of Nutt-Shel Co., Glendale, Calif., manufacturer of precision industrial and aircraft fasteners and steel shop equipment . . . Wagner Bros., Inc., has purchased the assets of Automatic Molding Machine Co. of Los Angeles, Calif., including patent rights to the firm's automatic compression and injection molding presses for plastics.

* * *

Champion Spark Plug Co. has started construction of a $1 million engineering and research building for developing and testing spark plugs at Toledo, O.

News AUTOMOTIVE AND AVIATION

TEST CHAMBER

Test missile is removed after undergoing complete enviromental simulation in Tenny Stratosphere Chamber. Built by Tenny Engineering, Inc., for Canadian Westinghouse Co., the unit can simulate varying climatic conditions encountered in flight and perform vibration tests. Temperatures can be varied from —100F to +200F. Altitude tests can be carried out from sea level to 50,000 ft at an average rate of 5000 ft per minute of climb.

All Ford Assembly Plants Use New Quality Audit Program

All Ford Motor Co. assembly plants are using a new "quality audit" program to trace flaws to their source and improve product quality. The plan has been in use for four months, and Ford officials claim a 50 per cent improvement in workmanship as a result.

The quality audit plan was revealed at the Ford Div. national press preview last month in Detroit by division general manager J. O. Wright and quality control manager M. M. Dean.

Briefly, here is how the audit works. At each assembly plant—all divisions—an audit team takes cars at random from cars ready for delivery. Their audit, which takes about three man-hours, involves visual or operational checks of 1500 items. Their reports are wired daily to the divisional general managers and assistant general managers, and also to plant managers.

The plant auditors, in turn, are checked periodically by a team from Dearborn who drop in unexpectedly.

The body visual audit record includes checks of appearance such as metal finish, solder joints, paint, door fit, interior trim and paint, weatherstrips, glass and window operation. Special water test booths are used in leak checks. A chassis visual audit records flaws in such items as instruments and controls, operation of accessories, brake, clutch and transmission controls, under-hood inspection, under frame, fuel and brake lines, and others. Other audits involve a road test, torque check, headlight aim, wheel alignment, etc.

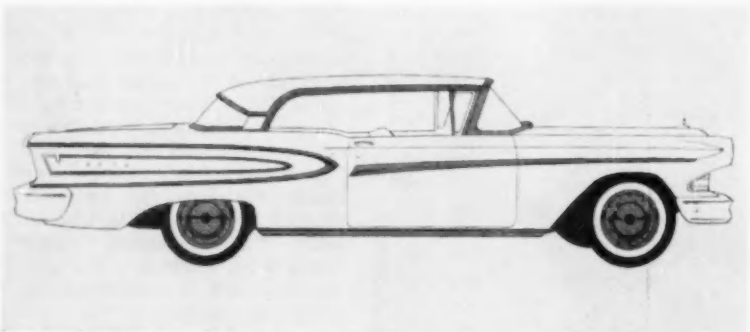
The plant manager is able to correct any flaws in assembly by tracing the audit findings to the workman responsible.

Chevrolet Has Only New Body Among The Low-Priced Three

Chevrolet is the only one of the low-priced three to offer a new body on its 1958 line, but within the next two years all three of the cars—Chevrolet, Ford and Plymouth—will again produce new bodies.

All three had new bodies in 1955, but Ford and Plymouth used theirs only two years, introducing new bodies in 1957. Ford probably will stick to the two-year cycle by having another new body in 1959.

Chevrolet reportedly will keep its 1958 body only one year, with another complete change in 1959. The GM division is said to be planning tooling expenditures for its 1959 line about equal to its 1958 budget. Plymouth will stick with its current body for a third year in 1959, but then will build a new shell for the 1960 model.



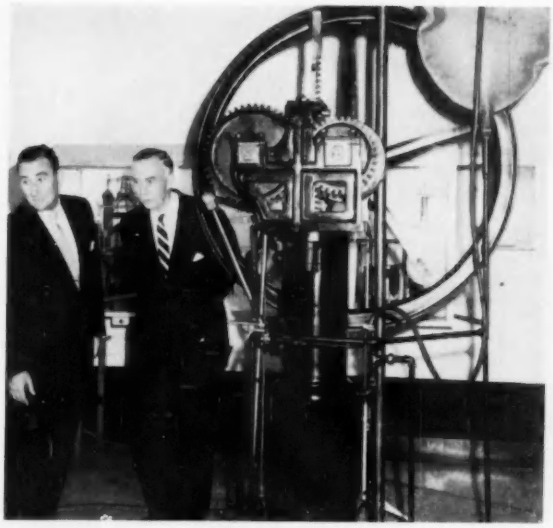
EDSEL GLOWS WITH STAINLESS STEEL BRIGHTWORK

Shaded areas in the above illustration indicate where stainless steel is being used for brightwork in the new Edsel. An average total of 36 lb of the material per car is employed for such applications as accent moldings for the side scallops; forward body moldings; rocker panel moldings; roof drip-rail moldings; rear window moldings; windshield moldings; windshield wipers; and wheel covers.

US Rubber Executive Predicts Big Increase in Tire Sales

US Rubber Co. chairman H. E. Humphreys, Jr. has predicted that replacement sales of passenger car tires will increase by 45 per cent in the next decade, reaching a volume of 80 million casings by 1967. In addition, another 11 million tires for trucks and buses will be sold that year, according to Mr. Humphreys.

As to the immediate future, he told the National Tire Dealers and Retreaders Association that 1957 will bring a record total of 55 million passenger tire replacement tires with a 1 million increase next year.



PIONEER ENGINE

Dr. Maximilian B. Bauer, at left, and Dr. Leonard Carmichael, secretary of the Smithsonian Institution, stand alongside one of the earliest atmospheric gas engines. Dr. Bauer represents Kloeckner - Humboldt - Deutz A. G., of Cologne, Germany, which presented the engine to the Washington institution. Inventor and builder of this engine, produced between 1866 and 1876, was Nikolaus August Otto, considered the father of the internal combustion engine.

Aeronutronic Buys 200 Acres For A New Research Center

Aeronutronic Systems, Inc., Ford Motor Co. subsidiary, has purchased 200 acres near Newport Beach, Calif., for a multi-million dollar research, development and prototype center.

Construction will begin in the near future on engineering and scientific laboratories and other facilities will follow. The center eventually will cover some 500,000 sq. ft of floor space.

Aeronutronic, a rocket and missiles research and development firm, will retain its central office in Glendale and its computer development laboratory at Van Nuys, Calif.

GMC Tractor Sets Record Without an Engine Change

A four-cylinder GMC Diesel truck tractor recently ran up a million miles, mostly over desert terrain, without an engine change.

Daniel Bryant, president of Bekins Van & Storage, said that since 1951 the tractor has made 840 round trips between Hollywood, Calif., and Las Cruces, N. M., for a total of 999,600 miles. Side travel from the terminal points accounted for the other 400 miles.

Bryant said that the tractor had moved about 100 million pounds of trailer-and-cargo weight, while setting the million-mile record, and is still operating with the original engine, crankshaft, block, and gear train.

Air Suspension Offered On All Edsel Models

Air suspension is being offered this month as optional equipment on all Edsel models. The Edsel system features three leveling valves, one on the rear and two on the front. Bellows are supplied by Firestone and General Tire & Rubber Co. Basically, the Edsel system is the same as the company-developed air suspension systems used on Ford, Lincoln and Mercury cars, with differences in dimension for various models.

Buick Ups Aluminum Use In Some 1958 Models

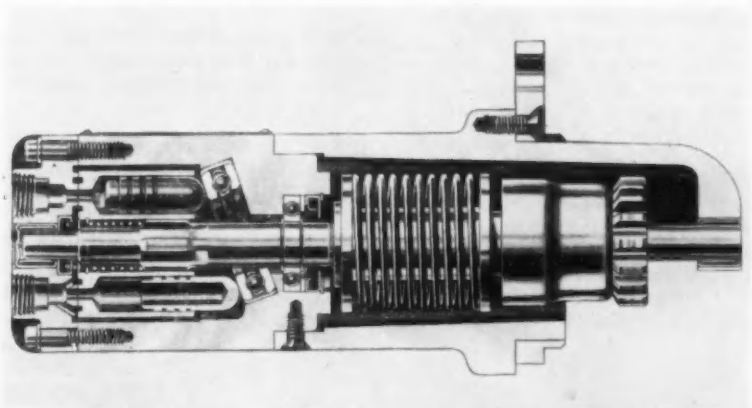
Buick is using up to 95 lbs of aluminum in some 1958 models that used only 50 lbs in 1957, saving about 180 lbs of weight. The division reports that 74 items on the 1958 cars are made of aluminum, ranging up to the 26 lbs aluminum transmission housing. All models with the new Dynaflow transmission, except the Special, have about 95 lbs of aluminum; the Special, which does not have aluminum front brakes, has about 76 lbs when equipped with the new transmission. Standard Specials have about 50 lbs.

Nuclear-Powered Air Transports With 50-Ton Payloads Are Seen

A large nuclear-powered air transport with virtually unlimited range is practical and can be built, according to Robert W. Middlewood, chief engineer of Lockheed Aircraft's Georgia Div.

Mr. Middlewood told the National Aeronautics Meeting of the SAE in Los Angeles that such a transport would most likely be a propjet, similar to the Lockheed C-130 Hercules. He based this prediction on the fact that a given amount of energy released from a reactor, if utilized in a propjet engine, will produce over three times as much thrust for takeoff as it will in a turbojet engine.

The nuclear-powered transport, he said, will most probably have one reactor as the basic power source. Shielding will probably be on the "divided" principle, in order to reduce weight. This means, he explained, that some of the shielding will be around the reactor and the remainder around the crew compartment and other radiation sensitive areas.



HYDRAULIC MOTOR REPLACES ELECTRIC MOTOR

Schematic drawing of the Hydrotor, a hydraulic starter for all types of Diesel and gasoline engines, shows its adaptation from the conventional electric starter. The electric motor is replaced by the positive displacement hydraulic motor. Hydraulic pressure against the moveable plungers within the motor (left) forces these plungers forward against the tilted ball bearing and causes the unit enclosing the plungers to rotate for the motivation of the starter. The Hydrotor was developed by Hydromotive, Inc., which was recently acquired by American Bosch Arma Corp.

MEN IN THE NEWS

Chrysler Corp. — John von Rosen has been named director of manufacturing engineering.

General Electric Co.—**Robert Paxton** was elected executive vice-president; **Arthur F. Vinson**, vice-president and group executive of the apparatus group; **James H. Goss**, vice-president of the consumer product group; **J. Herbert Smith**, president of Canadian General Electric Co., Ltd.; and **Halbert B. Miller**, a vice-president of the manufacturing services group.

International Nickel Co., Inc.—**Richard B. Kropf** has become supervisor of development activities in the automotive industry, and **Robert E. Savage** has been placed in charge of the Distributor Sales Section of the Nickel Dept.

Crucible Steel Co. of America—**Lester C. Hill** was named assistant sales manager of the Pittsburgh Crucible Sales Div.

U. S. Rubber Co.—**Eugene A. Luxenberger** has been named a group vice-president; **Earle S. Ebers**, a vice-president and general manager of the chemical division; and **C. William Pennington**, a vice-president and general manager of the footwear and general products division.

Firestone Tire & Rubber Co. of Canada, Ltd.—**William H. Funston** has been named chairman of the board; **T. M. Mayberry**, president; **R. I. Raycroft**, vice-president, sales; **D. R. Caskie**, treasurer; and **S. F. Palmer**, assistant to the president.

SKF Industries, Inc. —William C. Wright has been appointed production manager.

U. S. Rubber Co.—George R. Vila was designated group vice-president, and John W. McGovern was elected president, succeeding H. E. Humphreys, Jr., who continues as chairman and chief executive.

Bendix Aviation Corp.—**R. J. Creagan** has been named head of the company's nuclear program.

Yale & Towne Mfg. Co., Yale Materials Handling Div.—**Frederick S. Miller** has been promoted to manager of Worksaver and Warehouser sales.

A. M. Byers Co.—**A. S. Chalfant** has been appointed director of steel sales.

Raytheon Mfg. Co.—**David D. Coffin** and **Thomas H. Johnson** have been elected vice-presidents.

B. F. Goodrich Tire Co.—**Walter E. Head** has been appointed manager of manufacturing, and **Frank E. Harper** has been named director of employe relations.

Eaton Mfg. Co.—**Martin D. Archangeli** has been promoted to general sales manager, and **Chester D. Christie** has become sales manager of the Axle Div.

Olin Mathieson Chemical Corp.—**Elmer M. Richardson** has been made director of marketing for Olin Aluminum.

Avco Mfg. Corp., Lycoming Div.—**C. Douglas Flanigen** was named chief engineer.

Cleveland Cap Screw Co.—Robert E. Thomas has been named general sales manager.

Bendix Aviation Corp.—J. Allan MacLean has been appointed assistant group executive.

American Brake Shoe Co.—**Robert J. Browne** was appointed director of defense products.

Borg-Warner Corp., Mechanics Universal Joint Div.—**R. A. Ramsay** has been appointed sales manager.

Aeroquip Corp. — **John C. Abbey** was appointed chief engineer of the Jackson engineering department.

Northrop Aircraft, Inc. — **Geoffrey Parsons, Jr.**, has been elected vice-president for Europe of Northrop International.

Necrology

Harold S. Falk, 73, president of Falk Corp., died Oct. 7, at Milwaukee, Wis.

E. B. Hill, 78, a retired vice-president and treasurer of Bethlehem Pacific Coast Steel Corp. and former treasurer of Bethlehem Steel Co., died Oct. 13, at Woodside, Calif.

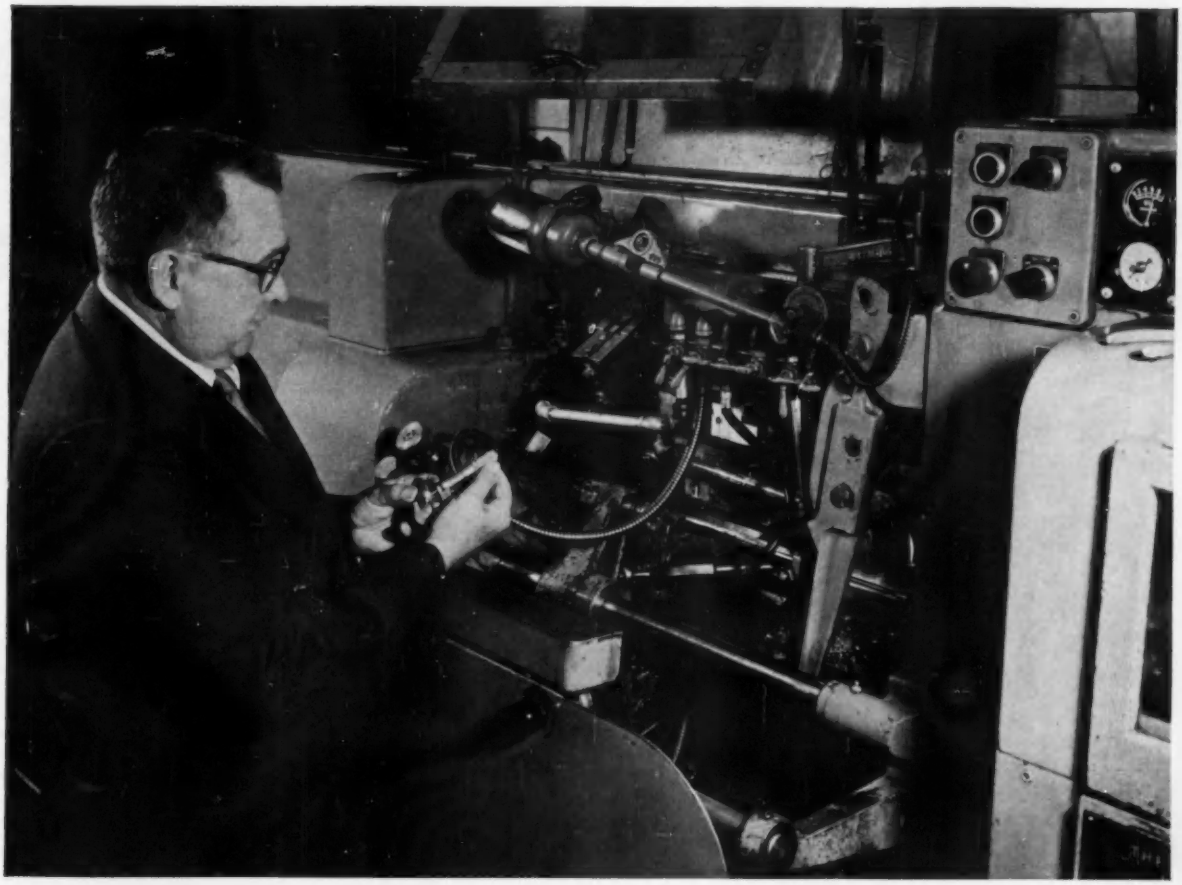
Carl F. Dietz, 77, former president of Lamson Corp., died Oct. 4, at Clearwater, Fla.

Dean E. Baskerville, 70, pioneer automobile body engineer, died Oct. 5, at Pontiac, Mich.

John C. Boyers, 78, retired president and treasurer of Ward Motor Vehicle Co., died recently, at Mount Vernon, N. Y.

Harold W. Melampy, 50, general manager of Roto Mfg. Co., died Oct. 8.

James E. Sullivan, manager of Lear, Inc.'s Washington, D. C., area office, died Sept. 29.



Clear, transparent Cleartex Oil boosts production, adds tool life

for Triangle Screw Products, Dayton, Ohio

Triangle Screw Products employ a sizable battery of automatics to produce screw machine parts of various shapes and sizes, in metals ranging from aluminum to stainless steels. For over fifteen years Triangle has used *Texaco Cleartex Oil* for all this work with the exception of the stainless steels which are machined with *Texaco Sultex Cutting Oil.*

Dual-purpose *Texaco Cleartex Oil* is used in automatics as cutting fluid and machine lubricant. Its excellent load carrying properties, and stability, mean better machining and better machine lubrication. And its transparency makes work inspection faster and easier.

There's a complete line of *Texaco Cutting, Grinding and Soluble Oils* promptly available to help you do all your machining better, faster, at lower cost. Let a Texaco Lubrication Engineer suggest the best ones for your jobs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

VISIT TEXACO—BOOTH 365—METAL SHOW—CHICAGO, NOV. 4-8

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

THIS RED LINE

"IN

Fellows Red Liner: Automatically makes and records a composite check of all gear errors in combination. Three capacities.

THE
PRECISION
LINE

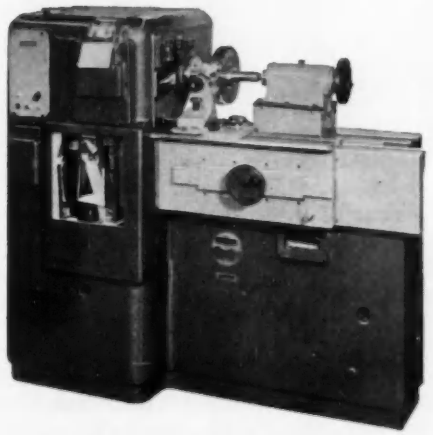
helps to keep production

THE BLACK"!

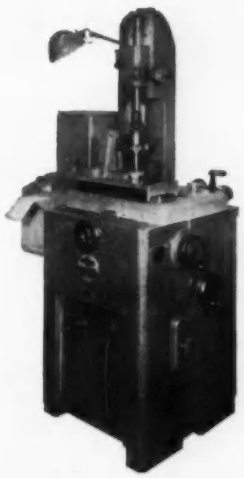
The red line on a chart from a Fellows Gear Inspection Instrument gives accurate, large-scale indication of gear errors and their nature . . . keeps production costs down by minimizing rejects. And the permanent chart gives recorded *proof* that gears meet specifications in every respect.

Whether you're manufacturing tiny, fine-pitch gears or large, coarse-pitch ones, for your own products or for customers, it pays to rely on Fellows inspection instruments. For full information, get in touch with your Fellows Representative. Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 319 Fisher Building, Detroit 2
150 West Pleasant Ave., Maywood, New Jersey
5835 West North Avenue, Chicago 39
6214 West Manchester Avenue, Los Angeles 45



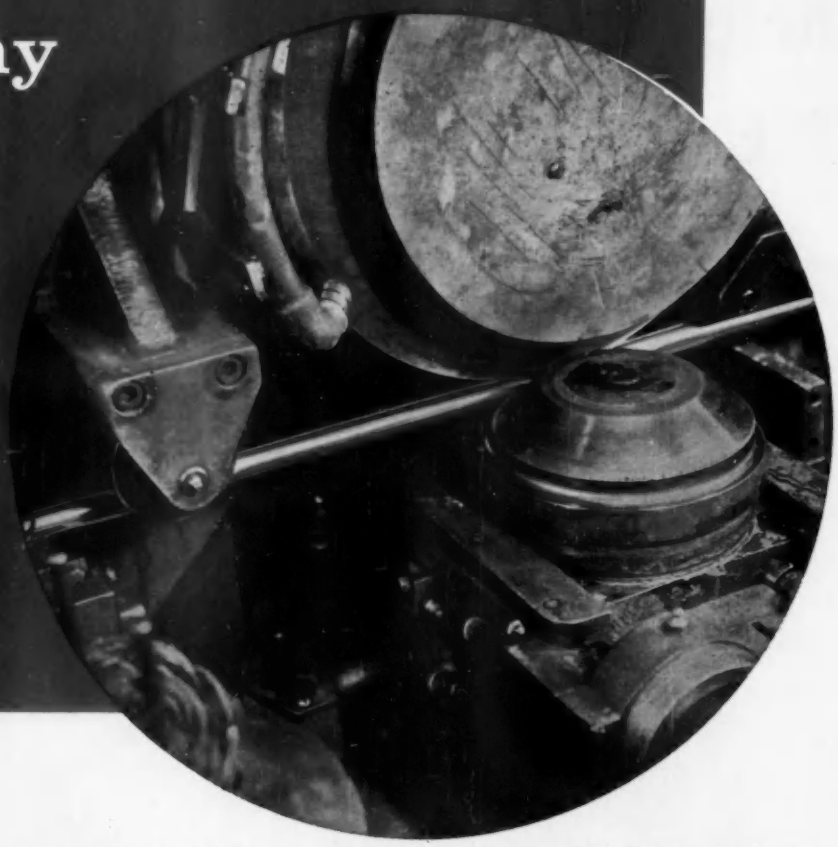
Fellows Lead Measuring Instrument: measures and electrically records the accuracy of helical and other surfaces; checks crown and taper. 12" and 24" P.D. capacities.



Fellows Involute Measuring Instrument: rapidly and easily checks involute profiles of external and internal spur and helical gears and records results. 12" and 24" P.D. capacities.

Fellows *Gear Production Equipment*

Why BUNDY Tubing Company uses A.W. Cold Rolled Steel



When 95% of today's cars use Bundy Tubing in an average of twenty applications, you can bet that the tubing must be right . . . and that the requirements placed on steel quality are exacting.

Bundy requires sheet steel that will meet tough demands of precision forming . . . provide top end-product performance over long miles of road wear . . . yet hold tubing production costs in line with vigorous competition.

Alan Wood produces and delivers cold rolled sheet to Bundy . . . and all other customers . . . on an "individual" order basis. Alan Wood's own metallurgists investigate the uses of customers' end-products and fabricating methods —then control the production of steel for each customer through each step—from mine to mill.

As a result, customers have steel to exact specifications. Production down time is minimized and rejects due to sub-standard material are cut . . . all of which helps improve customers' profits!

If your product requires uniform, high-quality steel, investigate the advantages of Alan Wood services and integrated production. Write Marketing Div., Dept. CR-S62, today.

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DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul San Francisco • Seattle

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IRON PRODUCTS
"Swede" pig iron

STEEL PRODUCTS
Plates (sheared)
A.W. Dynalloy (high strength steel)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip

ROLLED STEEL FLOOR PLATE
A.W. Algrip abrasive
A.W. Super-Diamond pattern

COAL CHEMICALS

A.W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

QUICK DELIVERY

Special fasteners to your requirements

Ferry Cap fills rush requests for custom-made threaded fasteners. That's been our business for 50 years.

To render even better service we will, if desired, "sit in" and help plan fasteners at the time products are designed.

Even if you don't anticipate a fastener problem, we'll be happy to look over your preliminary drawings—frequently we can suggest fasteners that will cut costs and assembly time. You can count on Ferry Cap, so call on Ferry Cap *TODAY!*

THE FERRY CAP & SET SCREW COMPANY

Makers of the famous Countr-Bor® Screw for socket head applications.

2191 SCRANTON ROAD • CLEVELAND 13, OHIO

FERRY CAP *is geared to FASTER SERVICE*

WHAT'S HAPPENING AT

Horizontal scanning with this Westinghouse induction hardening unit is particularly advantageous because the spray quench falls away from axle. Final quenched temperature of the part is controlled to yield a modified draw and to prevent cracking of deep splines and abrupt shoulders of the axle.

PRODUCT AND PROFIT IMPROVEMENT

OLIVER CORPORATION?

They are Saving More Than $1.00 per Axle ... with Westinghouse Induction Heating!

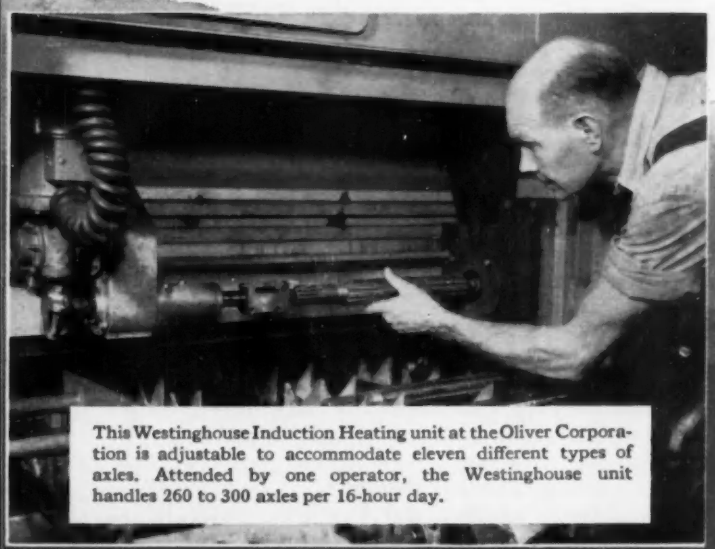
Here's really important news to everyone in metalworking. At Oliver Corporation, Charles City, Iowa, plain carbon steel is automatically heat treated to meet strength specifications . . . one operator takes care of automatic scanning, rapid heating, controlled quench . . . and the Westinghouse Induction Heating units are adjustable to accommodate eleven types of axles. In addition to savings of more than $1.00 per axle because the Westinghouse units made possible the change from an expensive alloy steel to plain carbon, Oliver Corporation cites many other advantages.

They say that with Westinghouse Induction Heating there is less distortion, therefore faster operation . . . 100% better control of case depth and many savings from the standpoints of operating and manufacturing. According to the Oliver Corporation, the Westinghouse Induction Heating units have "revolutionized our methods of heating."

PUT YOUR HEATING ON A PUSHBUTTON PRODUCTION LINE BASIS

For hundreds of plants, Westinghouse engineering has produced integrated induction heating equipment which is successfully handling highly specialized metallurgical and production requirements. Westinghouse Induction Heating can put the *exact* heat you want *exactly* where you want it—day after day, week after week, without variation.

YOU CAN BE SURE... IF IT'S Westinghouse



This Westinghouse Induction Heating unit at the Oliver Corporation is adjustable to accommodate eleven different types of axles. Attended by one operator, the Westinghouse unit handles 260 to 300 axles per 16-hour day.

WITH WESTINGHOUSE INDUCTION HEATING

BUT MAYBE INDUCTION HEATING IS NOT FOR YOU... LET'S FIND OUT

Telephone collect EDmonson 6-2300, or return this coupon to SALES MANAGER, Industrial Electronics Dept., Westinghouse Electric Corporation, P. O. Box 416, Baltimore 3, Maryland.

I believe that we qualify for Westinghouse Induction Heating. _____Please have your engineer call. _____Please send literature. We make_____(item) from_____(metal or alloy). Each piece is approx._____(size) and weighs approx._____. We work in temperature range of_____and handle approx._____per hour. We are interested in: _____Forging_____Hardening _____Joining_____Other.

Please describe briefly_____

Please check below the Westinghouse Induction Heating advantages you believe are superior to your present process.

_____Selective heat _____Safety
_____Instantaneous heat _____Consistent results
_____Minimum scale _____Production-line heating

Name_____Title_____

Company_____

Street & No._____

City & State_____

J-35002

The 1958 Buick Roadmaster 75

Many Design Changes

For 1958 Buick will offer an extensive line of models (see table) including the new Limited 700 Series which will have the same body styles as the Roadmaster but with extended rear ends for additional length and trunk space. As shown in the illustration, Buick has made some major appearance and styling changes in the new line.

Apart from the highlights of general features, the line exhibits some distinctive developments, the first of these being the optional Air-Poise suspension. Unique in design for these cars, it has an exceptional feature that may well be a "first." This is a dash control which permits the operator to raise the level of the entire chassis whenever road conditions or steep ramps justify the maneuver. Since the air suspension elements are designed to replace the coil springs at the corners, Buick with its torque tube drive does not require special chassis attachments which would otherwise be required for an air ride car.

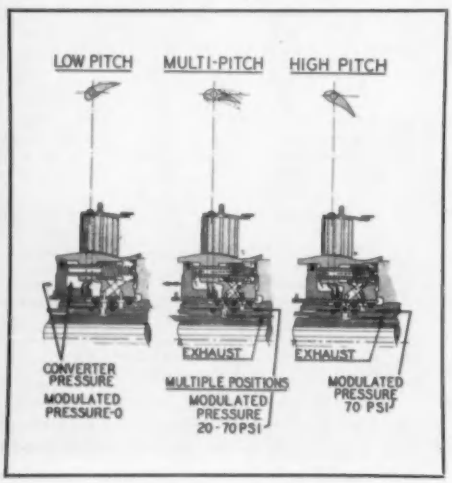
Another noteworthy feature is that 12 x 2½ in. aircooled bi-metallic aluminum front brake drums will be standard equipment on all series except the Special.

Doubtless one of the most important developments is the introduction of the new Flight-Pitch Dynaflow transmission, standard on Series 70 and 700, optional on the other series. This drive embodies three turbines in a new five-element torque converter.

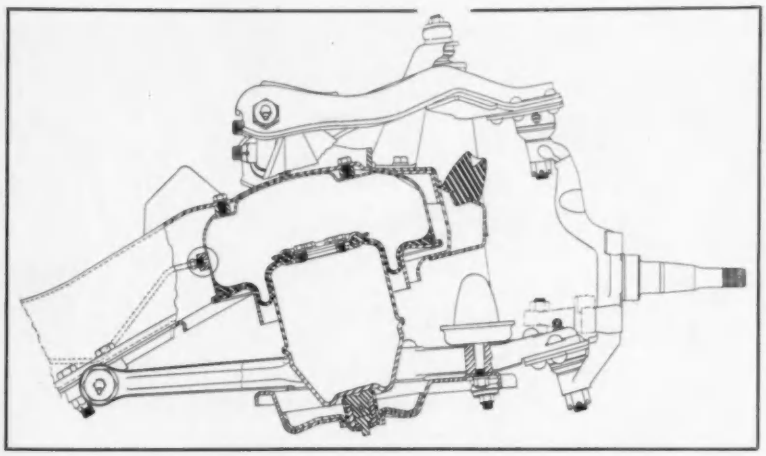
Incidentally, the dual headlamp system will be standard equipment on all models.

Engines remain substantially unchanged in mechanical details and ratings except for certain improvements. All engines will use an aluminum water pump cover which weighs only 1.2 lb. Some detail changes have been made to improve performance. One of these is the introduction of the Schwitzer fan drive on all models equipped with air conditioning. Employing a controlled torque driving clutch with silicone fluid, the drive will control fan speed in accordance with cooling requirements, thereby

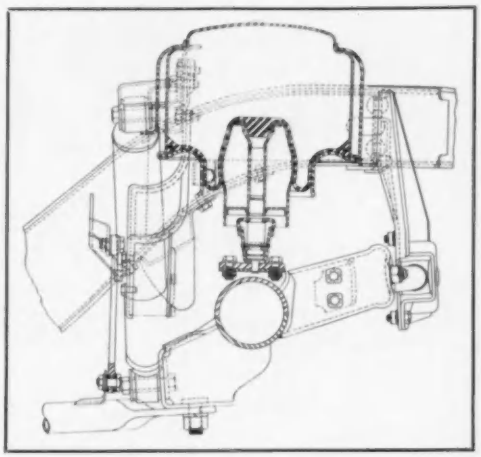
Multi-pitch stator of Flight Pitch Dynaflow



Aircooled bi-metallic front brake drum



Rear air suspension



Front air suspension

in 1958 BUICKS

reducing fan noise and resulting in a saving in power. One of the features of the fan drive is that it is arranged to drive at a limited top speed regardless of engine speed.

Powerplant mounting has been improved by utilization of the center-of-percussion principle in addition to the former tuned nodal point system. All cars equipped with the FlightPitch Dynaflow have the mounts at four points, while both the standard Dynaflow and synchromesh transmission cars will continue three-point suspension. Design of the FlightPitch Dynaflow makes it feasible to place transmission mounts at a certain angle such that all rotational motion of the powerplant about the principal axis will be controlled by the resilience of the mounts in shear.

Frames will be of two basic types: one for the optional AirPoise suspension with open air-dome sockets; and one for the coil springs with conventional spring seats. Both frames, however, accommodate any of the three transmissions by use of detachable brackets.

The ball joint front suspension is said to be completely redesigned. For 1958 it will be lighter but stronger and will be more accessible for servicing. At the same time it provides for the installation of either the standard coil spring or air springs. The upper arm now is a one-piece heavy gage stamping with the upper ball joint rigidly attached. With the changes in the front suspension arms, spring location is farther outboard, thus permitting softer springs for the same wheel rate.

Power brakes are standard equipment on Series 70 and 700, optional

(*Turn to page* 122, *please*)

1958 BUICK
Body Models

SPECIAL
- M/41 — 4-Door Sedan
- M/43 — 4-Door Riviera
- M/48 — 2-Door Sedan
- M/48R — 2-Door Riviera
- M/48C — Convertible Coupe
- M/49 and 49D — Estate Wagons

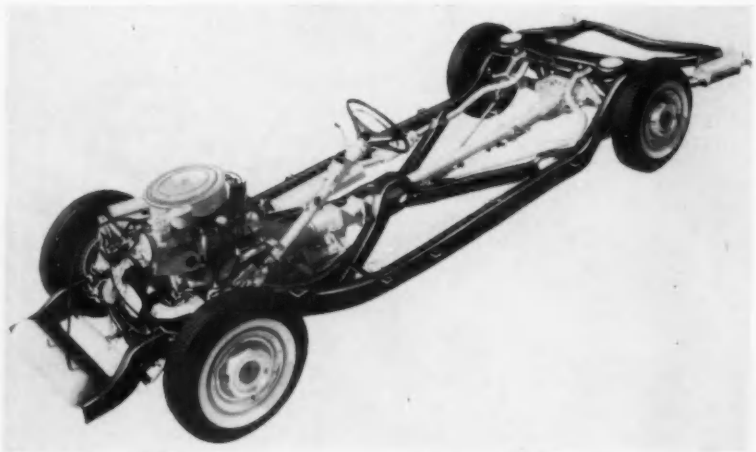
CENTURY
- M/61 — 4-Door Sedan
- M/63 — 4-Door Riviera
- M/66R — 2-Door Riviera
- M/66C — Convertible Coupe
- M/69 — Estate Wagon

SUPER
- M/53 — 4-Door Riviera
- M/56R — 2-Door Riviera

SERIES 70
- M/75 — 4-Door Riviera
- M/75R — 2-Door Riviera
- M/75C — Convertible Coupe

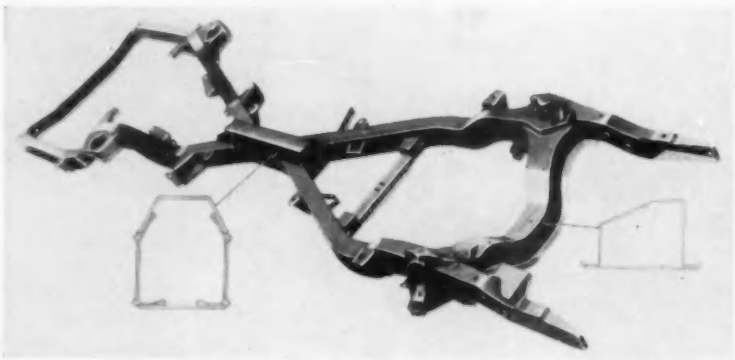
SERIES 700
- M/750 — 4-Door Riviera
- M/755 — 2-Door Riviera
- M/758 — Convertible Coupe

Air suspension chassis

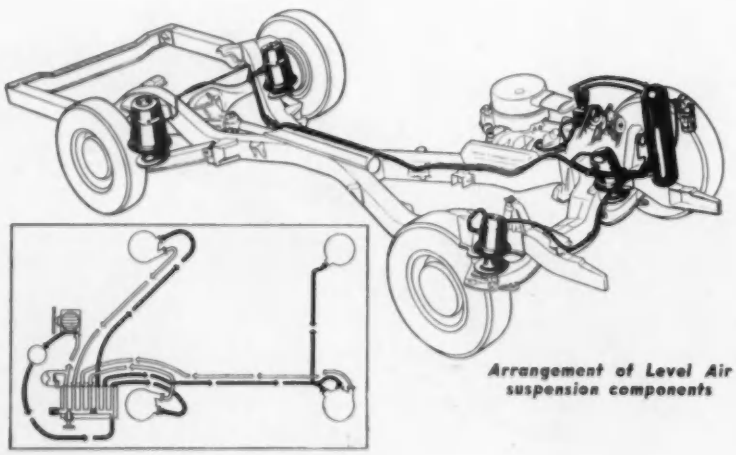


Chevrolets Have All Coil Chassis Springs and Optional Air Suspension

CHEVROLET'S completely restyled cars for 1958 are longer, lower, and wider than previous models. Among their new features are: an X-shaped frame; two suspension systems; a 348-cu-in. engine designed around a completely different combustion chamber, and forward-mounted steering linkage.



The X-frame permits lowering sections of the underbody



Arrangement of Level Air suspension components

The new rear suspension is described as "four-link" because the axle is attached to the frame at four points. The design employs coil springs and has control arms extending from the frame to the axle in a geometrical pattern that maintains consistent alignment. Lower control arms at each wheel are pivotally anchored at their forward end to frame brackets and at the rear to axle brackets. A single U-shaped upper control arm is pivotally mounted at the rear axle housing and curves upward to frame side member brackets. Shock absorbers are located between the rear section of the lower control arms and the frame.

Lower control arms receive both the vertical displacement of road irregularities and the braking and driving thrusts of the axle. These vertical forces are transmitted directly to the coil springs for absorption. The upper control arm is primarily responsible for lateral stability during cornering, and restricts driveline and axle windup.

Inherent in the system is a reduction of rear-end vertical displacement during acceleration and stopping. Tests are said to show that squat and lift are virtually eliminated.

A new "Level Air" system, which automatically adjusts to all load weights, is optional. In effect, the Level Air suspension automatically adjusts vehicle height through air spring leveling valves so that springing characteristics are uniform regardless of load or load location.

Level Air consists of an air

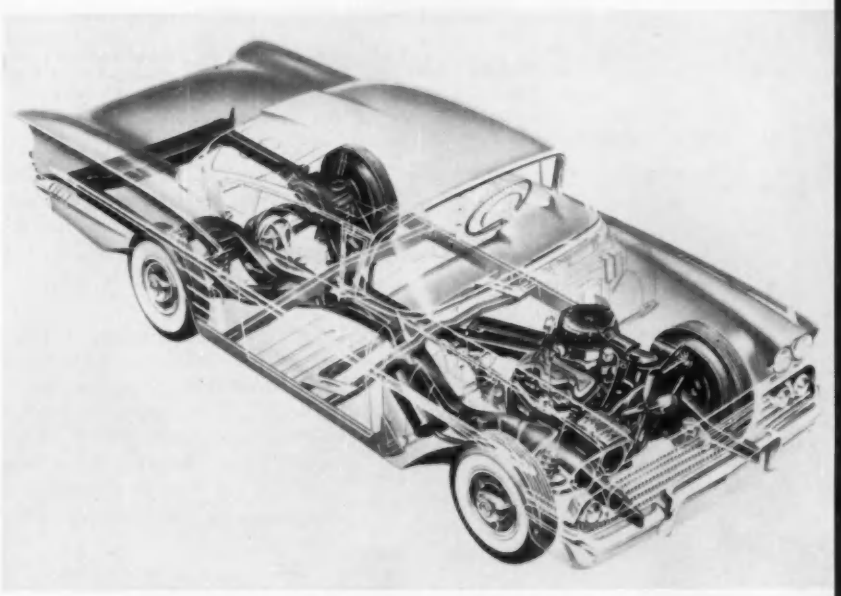
The Impala sport coupe

cleaner with an alcohol receptacle (to prevent icing in cold weather), a compressor, a high pressure accumulator, air line junction block, a bellows and reservoir at each wheel, leveling valves and air lines.

A metered amount of air is taken from the atmosphere through the alcohol to the compressor and stored in the accumulator. A high pressure line leads from the accumulator to the junction block which serves as a manifold for feeder and exhaust lines. Air lines from the block form a continuous circuit through the bell-shaped air spring housing, where valving controls interior pressures. Air is forced into the system only when the exhaust chamber of the junction block lacks sufficient pressure.

When the load is increased, air spurts into the reservoir and pressure rises in the system to maintain adequate ride clearance under all conditions. Pressures are conversely reduced when load diminishes.

The new Turbo-Thrust engine varies but little in width or length and is actually lower than the 283-cu in. engine which is produced as standard. Its displacement is 348-cu in. The combustion chamber is entirely within the block instead of extending into a domed indentation in the head. The top face of each cylinder block is inclined at 16 deg rather than machined perpendicular to the bore. Cast alu-

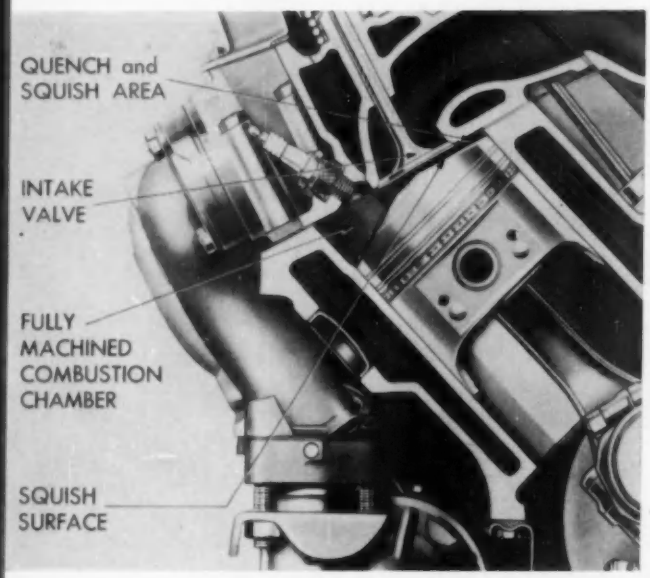


Phantom view showing chassis with all coil spring suspension

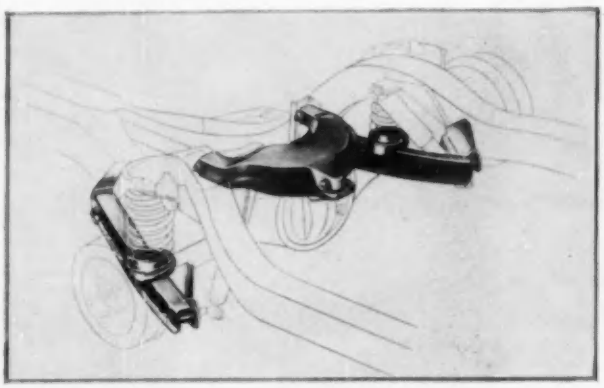
Specifications • 1958 CHEVROLET PASSENGER CAR ENGINES

All Overhead Valve Types

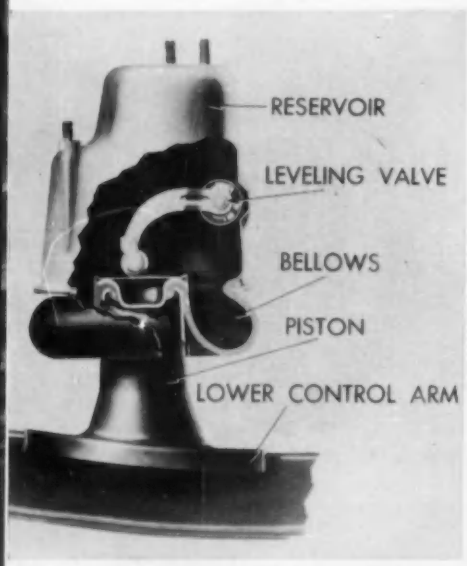
	283	283 Corvette	348	230
Displacement (cu in.)	283	283	348	230
Type	V-8	V-8	V-8	Inline-6
Bore (in.)	3.875	3.875	4.125	3.56
Stroke (in.)	3.00	3.00	3.25	3.94
Carburetor (std)	2-bbl	4-bbl	4-bbl	2-bbl
Bhp (max.)	185 @ 4800	230 @ 4800	280 @ 4400	145 @ 4200
Torque (lb. ft.)	275 @ 2400	300 @ 3000	355 @ 2800	215 @ 2400
Compression Ratio	8.5 to 1	9.5 to 1	9.5 to 1	8.25 to 1
Carburetor (opt.)	4-bbl	Two, 4-bbl	Three, 2-bbl	
Bhp (max.)	230 @ 4600	245 @ 5000	280 @ 4800	
Torque (max.)	300 @ 3000	300 @ 3800	355 @ 3200	
Compression Ratio	9.5 to 1	9.5 to 1	9.5 to 1	
Fuel System (opt.)	Fuel Inj.	Fuel Inj.		
Bhp (max.)	250 @ 5000	250 @ 5000		
Torque (max.)	305 @ 3900	305 @ 3900		
Compression ratio	9.5 to 1	10.5 to 1		
Fuel System (opt.)		Fuel inj. with high perf. camshaft		
Bhp (max.)		290 @ 6200		
Torque (max.)		290 @ 4400		
Compression Ratio		10.5 to 1		



Diagramatic illustration showing combustion chamber of the Turbo-Thrust V-8 engine



Rear coil spring suspension



Cutaway view of air suspension unit

minum pistons are similarly angled with 16-deg sloping surfaces. In this manner, half of the piston surface is closer to the head than the other and the irregularity of the chamber creates extreme gas turbulence.

Another advantage of the machined-in-block combustion chamber design is to permit placement of inlet and larger exhaust valves for high volumetric efficiency. Valves open from the flat face with no walls to restrict the passage of gases. Spark plugs are located near the center of the chamber. Flame travel is short and detonation is minimized.

A new configuration of the exhaust manifold also helps in engine breathing. Upon leaving the cylinder heads, exhaust gases are forced downward toward the exhaust pipes. Freedom from drastic bends in the pipe promotes low back pressures in the dual exhaust system.

Uniform engine cooling is provided through the location of water pump outlets at the outer jackets of the cylinder block. Outlets are positioned so that coolant may flow freely around each bore and then into the cylinder head.

A full pressure lubrication system is wholly contained within the cylinder block and head castings.

Compression ratio of the new engine is 9.5 to 1. A four-barrel carburetor is standard equipment together with hydraulic valve lifters. Optionally available is a triple two-barrel carburetor arrangement. Oil capacity is four quarts.

The Turbo-Thrust will be available with three-speed manual transmission, the Powerglide or the Turboglide automatics.

The new engine is one of five V8's and a six-cylinder in the new line. Ramjet fuel injection, introduced last year, is again offered as an option on the 283-cu in. V8. Automatic Turboglide, Powerglide, an improved three-speed SynchroMesh and the overdrive are again available. Totaled, Chevrolet gives the buyer his pick of 18 power trains.

Clutches are of a new design. Generator capacities have been boosted 20 per cent to compensate for dual headlamps which are standard. A two-piece propeller shaft design allows the front section to assume a specified angularity with the transmission while the rear section is free to follow rear axle movements.

The underbody is a heavily reinforced component that gives maximum integration between body and frame designs. Underbody crossmembers are increased in section and rigidity, serving as strong girders between the rocker panels. Body rocker panels have been extended to the dash panel, stiffening the body forward area.

Here is the body lineup of 1958 Chevrolet passenger cars:

Station Wagons — Nomad (4-door, six passenger), Brookwood (4-door six and nine-passengers), Yeoman (2 and 4-door six passengers).

Bel Air—Impala (convertible and sport coupe), 2-door sport coupe, 4-door sport sedan, 2-door sedan, 4-door sedan.

Biscayne — 2-door sedan, 4-door sedan.

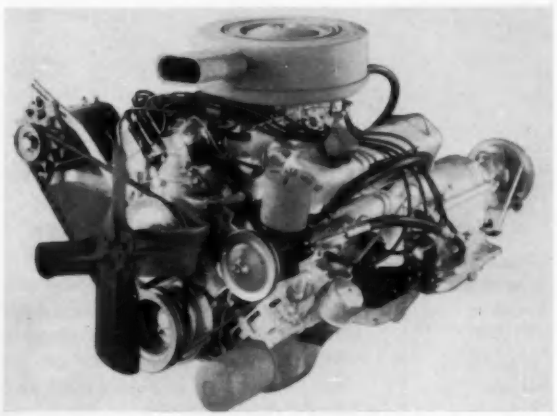
Delray — 2-door sedan, 4-door sedan, 2-door utility sedan.

Two New V-8 Engines for De Soto's 1958 Line

1958 DE SOTO V-8 ENGINE SPECIFICATIONS

OHV—Single Rocker Shaft

	Firedome	Fireflite	Firesweep	
Bore (in.)	4.12		4.06	
Stroke (in.)	3.38		3.38	
Displacement (cu. in.)	361		350	
Compression ratio	10 to 1		10 to 1	
Bhp (max.)	295 @ 4600	305 @ 4600	280 @ 4600	295 @ 4600
Torque	390 @ 2400	400 @ 2800	380 @ 2400	385 @ 2800
Carburetor	two-barrel	four-barrel	two-barrel	four-barrel (Power-Package)



The new Turboflash engine

De Soto's 1958 line will include 18 new models which incorporate numerous styling and mechanical changes, and two completely new V-8 Turboflash engines.

With the addition of a new Firesweep model, four different convertibles are available in the De Soto lineup: Adventurer, Fireflite, Firedome and Firesweep. Four-door sedans are offered in each of the three series, as well as two- and four-door Sportsman hardtops. The Firesweep is built on a 122-in. wheelbase and the other lines have a 126-in. wheelbase.

The Firesweep and Fireflite lines offer the two-seat Shopper and the three-seat nine-passenger Explorer station wagons. With seat folded flat into the floor they provide 95 cu. ft. of cargo volume. Captive-air tires are standard equipment on all three-seat Explorer station wagons.

Torsion-Aire, the suspension system introduced in 1957 as standard equipment on all lines, has been improved with the addition of new, longer outboard-mounted rear springs with an additional half leaf for the rear axle which further reduces the rear end roll and prevents "acceleration squat."

The two new Turboflash engines have bores of 4.06 in. and 4.12 in. and displacements of 350 and 361 cu. in. respectively. Both have a stroke of 3.38 in. and a 10 to 1 compression ratio.

The Firesweep is powered by a 280 hp, 350-cu in. displacement engine. A single two-barrel carburetor is used with the Firesweep as standard equipment. A four-barrel carburetor, increasing the Firesweep's horsepower to 295, is available with a power package.

A two-barrel carburetor is standard for the Firedome, giving it 295 hp, and a four-barrel carburetor is stand-

(*Turn to page 92, please*)

Four-door sedan Firedome De Soto

Mercury Adds Big Park Lane Series to Line

FOUR series of passenger car models and station wagons are offered by Mercury for 1958. These are identified as follows: Monterey—two-door sedan; four-door sedan; phaeton coupe; phaeton sedan; and convertible phaeton. Montclair—four-door sedan; phaeton coupe; phaeton sedan; convertible phaeton; two-door Turnpike Cruiser; four-door Turnpike Cruiser. Park Lane—phaeton coupe; phaeton sedan; and convertible phaeton. Station Wagons—Commuter models—two-door, 6-pass.; four-door, 6-pass.; four-door, 9-pass. Voyager models—two-door, 6-pass.; four-door, 9-pass. Colony Park four-door, 9-pass.

Monterey, Montclair and Station Wagon models are mounted on the 122-in. wheelbase chassis while the Park Lane models have a new 125-in. wheelbase chassis. Both frames are alike in design, the longer frame being of heavier stock and extended at the rear to accommodate the longer body.

Entirely new styling and important mechanical features characterize the entire line as will be described later. At this point it is noteworthy that Mercury will offer an air cushion suspension (full air suspension), optional on all models at the start of production. The line also features two new, higher displacement basic engines—383 cu in. and 430 cu in.—all with 10.5 to 1 compression ratio. With certain carburetor options these basic engines provide four different powerplants.

Transmission options, too, have been expanded to include: standard synchromesh with or without overdrive; the Merc-O-Matic drive; and a beefed up version of Merc-O-Matic—the Multi-Drive transmission.

Dual headlamps are standard equipment on all models.

A distinctive optional feature on all models is a vacuum-operated, heater-defroster-ventilator, and air-conditioning control (where air-conditioning is specified) system in which a single control knob on the dash selects the desired conditions. The vacuum control then makes the

1958 MERCURY ENGINES

V-8 OHV Type

Major Mechanical Specifications

Bore (in.)	4 30		4 30	
Stroke (in.)	3 30		3 70	
Displacement (cu in.)	383		430	
Compression ratio	10.5 to 1			
Bhp (max.)	312 @ 4600	330 @ 4800	380 @ 4600	400 @ 4600
Torque (lb ft) max.	405 @ 2900	425 @ 3000	480 @ 3000	480 @ 3000
Carburetor	4-bbl economy	4-bbl	4-bbl	6-bbl
Ratio Bhp/cu in.	0 814	0.861	0.837	0.930
Ratio torque/cu in.	1.057	1.109	1.116	1.116
Bore/stroke ratio	1.3		1.16	

Park Lane phaeton sedan

adjustments in temperature range and dampers automatically.

Other optional features include: Multi-Luber; electric windshield wipers; and a new speed warning device employing a bell tone as the warning signal.

The new Multi-Drive transmission is standard on Park Lane models; and must be used whenever the 430-cu in. engine with 3 two-barrel carburetors is specified as an optional feature on any model in the line. This automatic transmission is a redesigned version of the Merc-O-Matic to handle the increased torque capacity of the larger engines. It is used in conjunction with a new keyboard control to provide three normal driving ranges: *Hill control* or low range which places the drive in first gear for maximum engine braking on steep grades or for extra pulling power. It will not shift out of this position until the control position is changed. *Cruising Range*—for normal acceleration. Here the transmission starts in second gear and shifts into high gear automatically. This selection, with engine running, also automatically provides a hill-holder, preventing the car from rolling back when stopped on a grade. *High performance range*—for high acceleration. With this selection the transmission starts in low gear and shifts automatically through the gears to direct drive.

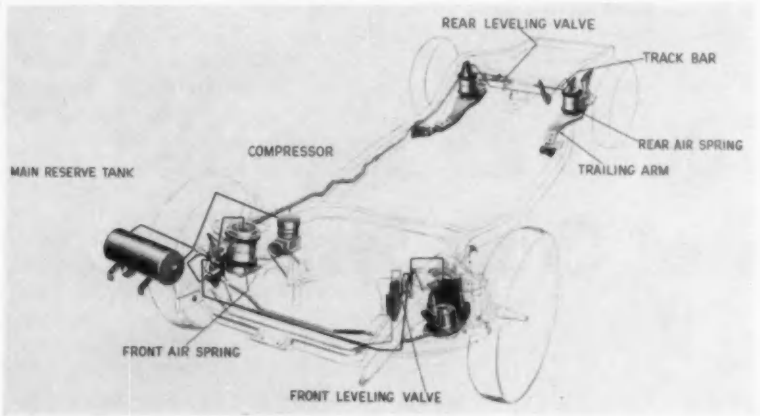
The keyboard also has keys for reverse and neutral start for engine starting and a parking brake release. A bar below the keyboard provides for the parking position.

A new control valve box and the addition of a one-way sprag type clutch are incorporated in the transmission to produce the multi-range option. In addition, the basic Merc-O-Matic embodies a welded steel converter which replaces the bolted construction used heretofore.

Taking advantage of the higher performance of the new engines, rear axle ratio now is 2.69 to 1 with automatic drive to reduce engine speed and drive line activity.

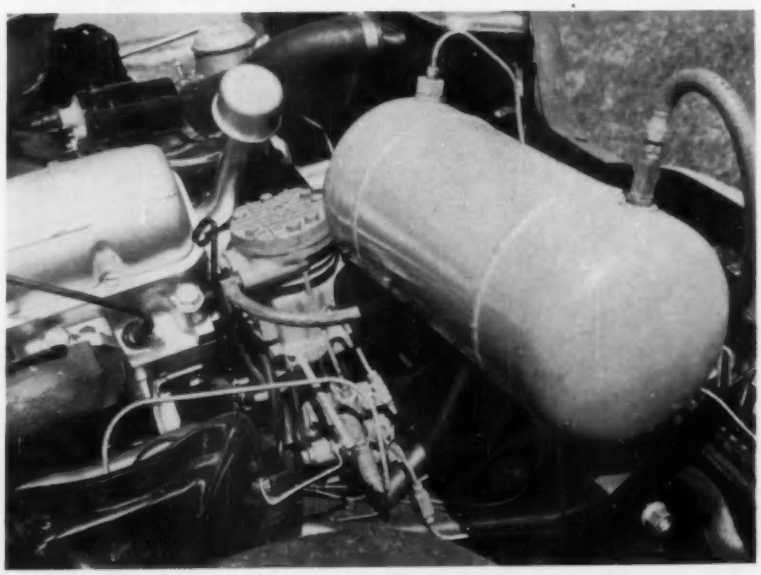
The new air cushion suspension is offered as optional equipment on

(*Turn to page* 91, *please*)

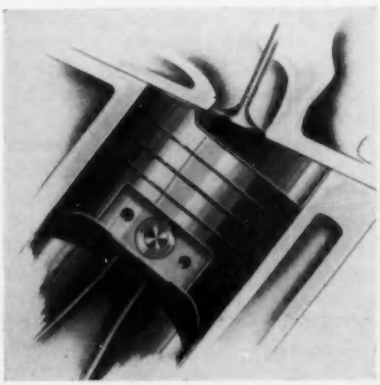


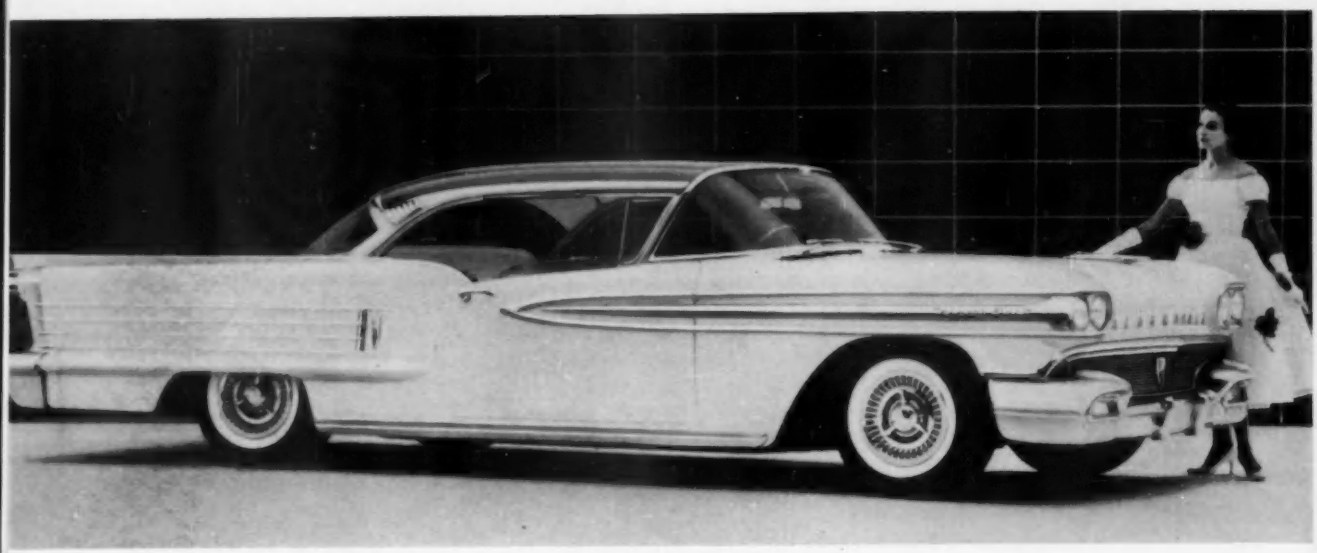
Mercury's new "Air Cushion Ride" is shown in above diagrammatic sketch.

This is how the front end of the engine compartment of a 1958 Mercury looks when air ride components are specified. The large air reservoir in the foreground is installed under the front end of the front fender. Immediately to the left is the engine-mounted air compressor. Some of the valving for air ride control may be seen clustered directly in front of the compressor.



New configuration of Mercury V-8 engine combustion chambers. The cylinder head is machined flat and is free of the usual cavities. The bank surface of the cylinder block, in turn, is machined at an angle of 10-deg to form the combustion chamber wedge. The stepped piston dome provides the quench area.





The 98 Holiday coupe

Oldsmobile Offers Air Suspension with Closed Circuit System

FEATURING fresh styling, the 1958 Oldsmobile line offers numerous mechanical improvements, including its own unique type of air suspension—New-Matic—available as an extra cost option throughout the line. The familiar body models are continued in the Series 88, Super 88, and 98.

Dual headlamps—four-beam, as Oldsmobile terms them — are standard on all models.

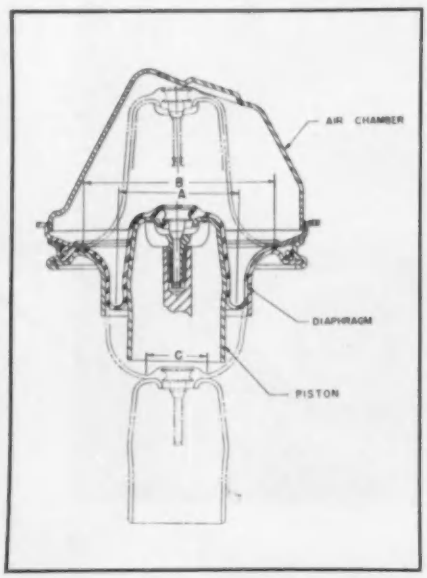
While the basic engine remains the same in displacement, the increase in compression ratio to 10 to 1 plus other detail changes combines to produce an increase in both horsepower and torque ratings on Super 88 and 98.

Common to all engines are new intake manifolds with larger ports, an improved camshaft with altered cam profile, four-quart capacity oil pan, a new vibration damper, and a new vacuum unit for the distributor. The valve train has some interesting improvements. Valve springs are new, of conical form, said to have greater durability and better operation at high speeds. Incident to this, the valve spring damper, used heretofore, has been eliminated. In addition, intake valves of lighter weight are employed, adding to improvement in high speed operation.

The Series 88 engine is equipped with a two-barrel carburetor to provide for added fuel economy. It has an aluminum foil air cleaner as standard equipment.

The Series Super 88 and 98 engines have a 4-barrel carburetor as standard equipment, the new carburetors having larger bores for increased capacity. The air cleaner is of heavy duty type with the disposable paper element. This air cleaner is made available on the Series 88 engine as optional equipment. A change for 1958 is that the single exhaust system is standard on the Super 88, dual exhaust being made optional equipment. The J-2 Rocket engine with three, two-barrel carburetors is available as an optional extra on all series.

Sectional view of rear air spring

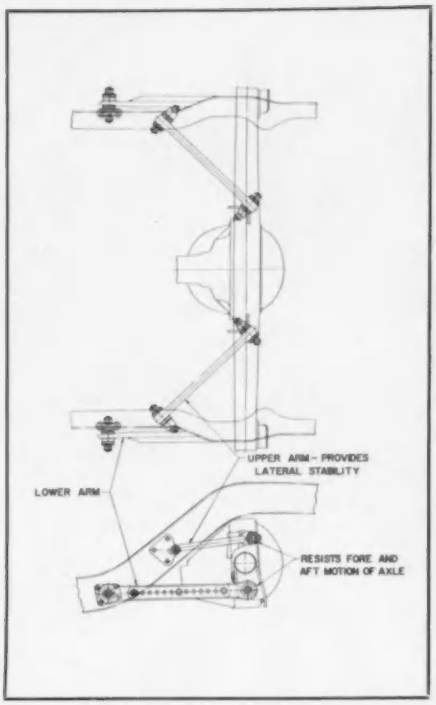


1958 OLDSMOBILE ENGINES

Brief Mechanical Specifications

(OHV-V8)

	Series 88	Super 88	Series 98	J-2
Bore (in.)	4			
Stroke (in.)	$3^{11}/_{16}$			
Displacement (cu. in.)	371			
Compression Ratio	10 to 1			
Bhp (max.)	265 @ 4400	305 @ 4600	305 @ 4600	312
Torque (lb ft) max.	390 @ 2400	405 @ 2800	405 @ 2800	414
Carbureter	Dual	4-bbl	4-bbl	3, 2-bbl
Exhaust System	Single	Single	Dual	Dual



Four link rear suspension

Hydra-Matic drive too has been improved in detail. It now contains an internal thermostatic control which limits oil flow in accordance with ambient temperature conditions. This makes for faster flow of fluid in cold weather, thus improving and smoothing the shifts in cold weather operation. A new parking lock pawl reduces effort in selecting park position. The torus cover has been changed to improve oil sealing. Another important change, effective in improving durability, is the adoption of needle thrust bearings, replacing the bronze washers currently employed at a number of points.

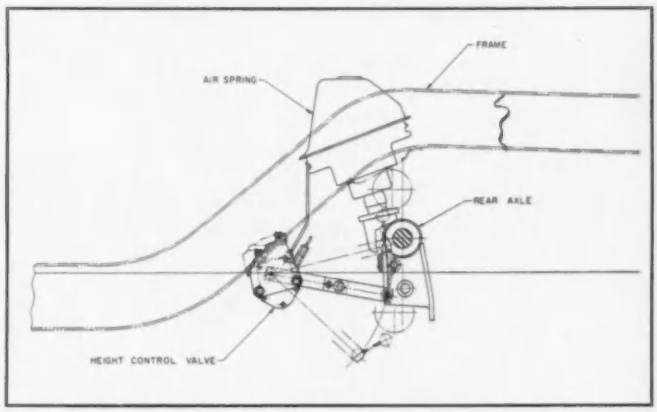
The valve body has been provided with a double orifice system for rear clutch control. This aids in compensating for the increased torque of the engines.

Only minor chassis changes appear in the standard models. One significant change is that convertibles now are mounted on the standard sedan frame. On manual steering gear the ratio has been upped to 23.8 to 1 for easier handling. The fuel filler has been moved to the left taillight body.

Perhaps the biggest story is found in the adoption of air suspension. This installation, available as optional equipment on all models, takes an entirely different chassis frame. With it there is an increase in rear tread to 59-in., and total weight of the car is increased by 90 lb.

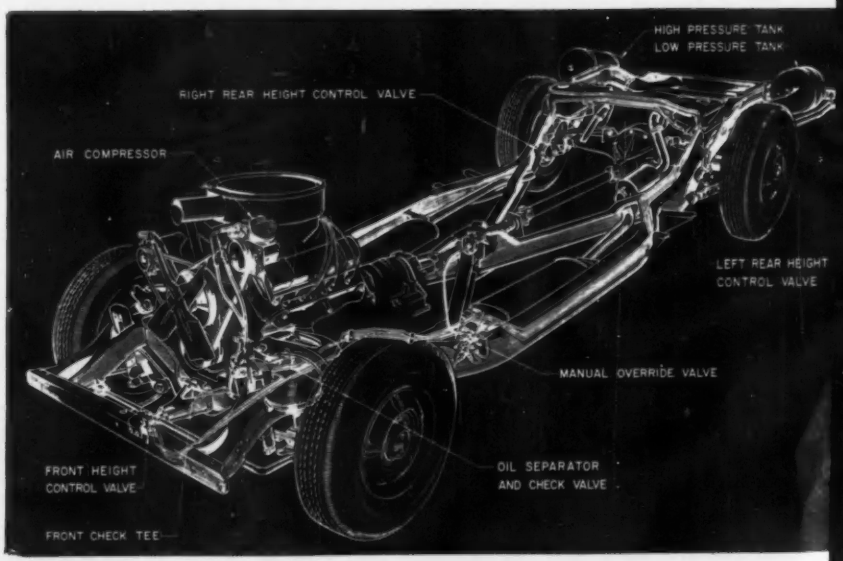
It employs diaphragm type air springs as contrasted with the bellows type. These replace the coil springs at the front. At the rear the air springs replace the

(*Turn to page* 93, *please*)



Rear height control valve installation

Arrangement of New-Matic Ride components



New Lincoln and Continental Models

LINCOLN WILL PRESENT SIX NEW MODELS—a four-door sedan, a four-door hardtop, and a two-door hardtop coupe—in the Premiere and in the Capri lines for 1958.

The 1958 Lincolns will be built in a plant specifically designed for integrated body and frame construction. This new method has allowed the designers to lower the height of the car, strengthen its torsional rigidity which resists body twisting effects on rough roads. The floor pan, side panels, roof panels, quarter panels are all welded into one single unit.

Wheelbase is 131 in., an increase of five inches over the 1957 models. Over-all height is 56.5 in.

Standard items are: power steering; automatic transmission; power brakes; five ash trays with lighters; foam rubber seat cushions; warning lights for braking; oil pressure and low fuel supply. All cars have dual headlamps.

Standard safety features include: safety door latches; deep-dish steering wheel; padded instrument panel; padded sun visors; dual windshield washers and directional signals.

THE CONTINENTAL, FOR 1958, OFFERS an expanded line of four models. For the first time, Continental will have a four-door sedan, a four-door hardtop, a soft top convertible as well as the well-known two-door hardtop.

Of the new models, the soft top convertible is the first in the industry with a reverse slanting all-glass rear window, which opens and closes by a power operated switch located on the driver's armrest. The soft top is completely automatic and folds down behind the rear seat.

Overall length is 229 in., while overall height is 56.5 in. Interior dimensions are increased due to the new type of construction which allows the individual to step down into the car.

A reverse slanting rear window is power operated by the driver. Power windows all around are standard equipment in the Continental. In addition, the driver can lock out the power windows, precluding tampering by small children. The latter is an optional accessory. All Continentals have an automatic transmission, power steering, power brakes, and a remote controlled outside rear view mirror as standard equipment. Dual headlamps are standard on all cars.

Standard safety features include: safety door latches, deep-dish steering wheel, padded instrument panel, padded sun visors, dual windshield washers and directional signals.

LINCOLN AND CONTINENTAL FOR 1958 INCLUDE, among engineering advances, a completely new engine with higher compression ratio and more horsepower, a new rear suspension, and an improved transmission. The engine has a displacement of 430 cu in., a horse-

Lincoln Premiere two-door hardtop coupe

Continental Mark III soft top convertible

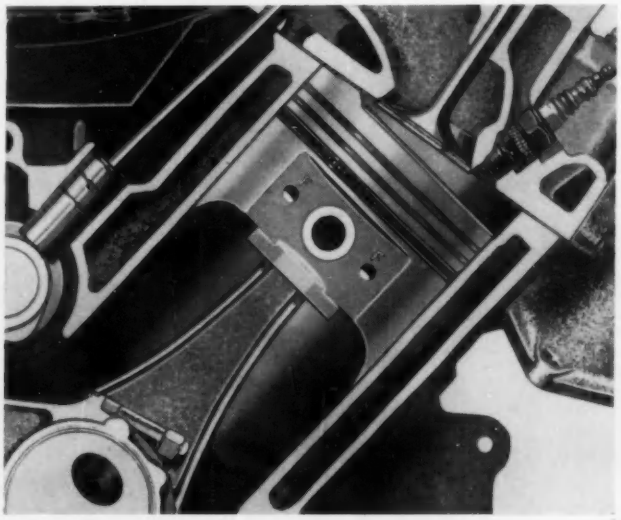
Continental Mark III four door hardtop sedan

power rating of 375 at 4800 rpm, and delivers 490 lb ft of torque at 3100 rpm. It has a new block, stronger crankshaft, heavier connecting rods and an improved lubrication and cooling system. Faster, easier servicing of engine components is made possible by greater accessibility of spark plugs, distributor, fuel pump and the oil filter.

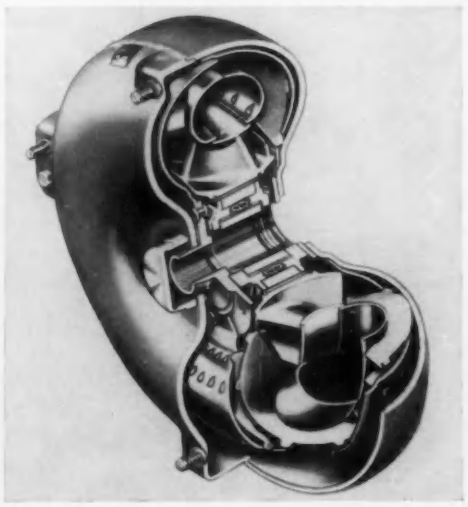
A lighter cylinder block was accomplished without sacrifice to rigidity or strength. Combustion chambers have been designed into the block rather than being cast into the cylinder head. The new design

(*Turn to page* 92, *please*)

This cutaway view shows the larger connecting rod, new head design, special piston head shape, etc.



The welded steel converter assembly is an integral unit which encloses impeller, stator and turbine in 1958. In prior years, elements were assembled independently into transmission.



Larger Imperials Have More Powerful Engines

THE Imperial cars are longer and more powerful for 1958, and feature such optional equipment items as an Auto-Pilot pushbutton driver assist, a dual air conditioning unit, a new electric door lock, and a limited-slip differential.

The cars are available in a choice of four series. The Imperial series is offered in a four-door sedan, two-door hardtop and four-door hardtop. The Imperial Crown series is available in a four-door sedan, two-door hardtop, four-door hardtop and convertible. The Imperial LeBaron series is offered in a four-door sedan and a new four-door hardtop.

Auto-Pilot, pushbutton automatic driver assist, allows the driver to select any turnpike cruising speed he desires by means of a dial on the instrument panel. When the car has attained this pre-selected speed a warning back pressure develops on the accelerator pedal. Completely automatic throttle control can be arranged by pushing a button recessed in the speed selector. The driver can then remove his foot from the accelerator pedal. Automatic control is ended by a touch on the brake pedal.

The 1958 Imperial is powered by a 392-cu in. FirePower V-8 engine with a 10:0 to 1 compression ratio. With a bore of 4.0 inches and a stroke of 3.9 inches, displacement is 392 cu in. Exceptionally quiet operation is said to be achieved by use of off-center spool-type rubber engine mountings.

Available as optional equipment on all 1958 Imperials are an entirely new type of tires called Custom Super Soft Cushion. With recommended pressures of 17 lb in front and 14 lb in rear, they are the largest and softest tires ever offered on a production passenger car. Their dimensions are 11 x 14 and they have six-ply construction. They give the Imperial customer a choice of conventional, Captive-air or Custom Super Soft Cushion.

Standard equipment on all series of Imperials includes Torsion-Aire suspension, TorqueFlite transmission, power brakes, power steering, air foam seats, back-up lights, electric clock, directional signals, dual headlights, foam safety dash pad, windshield washers, brake warning light and undercoating.

Standard equipment on Imperial Crowns and Imperial LeBarons also includes six-way power seat and power windows.

Power and convenience options include dual air conditioner-heater, single air conditioner-heater, Auto-Pilot automatic throttle con-

CHRYSLER DIVISION V-8 ENGINES

Model	Windsor	Saratoga	New Yorker Imperial	300D	
Bore (in.)	$3^{15}/_{16}$			4	
Stroke (in.)	$3^{5}/_{8}$			$3^{29}/_{32}$	
Displacement (cu in.)	354			392	
Compression Ratio	10 to 1			10 to 1	
Bhp (max.)	290 @ 4600	310 @ 4600	345 @ 4600	380 @ 5200	390 @ 5200
Torque (lb ft)	385 @ 2000	405 @ 3200	450 @ 2800	435 @ 3600	435 @ 3600
Carburetor	2-bbl	4-bbl	4-bbl	2, 4-bbl	Fuel Inj.

Imperial Crown four-door hardtop

trol, captive-air tires, custom super soft tires, search-tuner radio, rear window defogger, seat belts, Solex glass, transistorized search-tuner radio with rear speaker and power antenna, instant-heat heater, electric door locks, Flight-Sweep rear deck lid, remote control outside rear-view mirror, and shaded backlight.

All doors of the car can be electrically locked or unlocked with a single finger motion. This is made possible by Imperial's exclusive integrated electric door locks. Unlike previous systems, a door locked electrically can be unlocked mechanically and vice versa. A button similar to an electric window lift button is positioned on each front door. Touching the button locks or unlocks all car doors.

Dual horizontal headlights are standard on all models.

The new "Constant Control" power steering, Sure Grip differential, and fuel injection were described in Automotive Industries, October 15, page 52.

Chrysler Introduces All-New Windsor Series

NEW Chryslers are offered in a total of 14 models in three series. The all new Chrysler Windsor is available in a four-door sedan, two-door hardtop, four-door hardtop, two-seat Town and Country station wagon and three-seat Town and Country station wagon. The Saratoga is available in a four-door sedan, two-door hardtop and four-door hardtop. The New Yorker is offered in a four-door sedan, two-door hardtop, four-door hardtop, convertible, two-seat Town and Country station wagon and three-seat Town and Country station wagon. There is also a new Chrysler 300-D with optional fuel injection engine.

All Chryslers for 1958 are powered by modified V-8 engines with 10-to-one compression ratios. The higher compression ratio makes possible new and more economical 2.93-to-one rear axle ratios.

The Windsor series has a 290-hp engine. The Saratoga series has a 310-hp engine. Both engines have a bore diameter of 3.94 in. and displacement of 354 cu in. The Fire Power engine in the New Yorker series has a 345-hp engine with a bore diameter of 4.0 in. and displacement of 392 cu in.

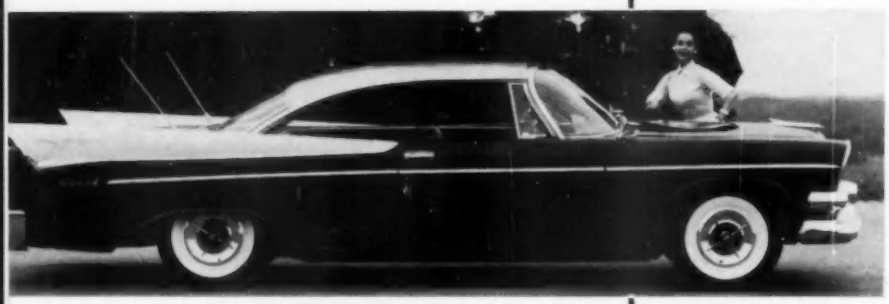
A new constant-control power steering unit with increased on-center feel for the driver is standard equipment on all Saratoga and New Yorker models and optional on Windsor. Steering effort is proportional to the force which is required to turn the front wheels.

A new dual super air conditioning unit for extermely hot weather conditions more than doubles the flow of cold air. It uses two separate evaporator and blower units, one located in the engine compartment and the other on a shelf in the luggage compartment. In addition to the new dual unit, an improved single-evaporator and blower unit which serves to circulate 15 percent more cool air is available.

Included in a complete range of power, luxury and safety equipment offered are Auto-Pilot, power brakes, power windows, six-way power seats, safety seat belts, instant heat conditionaire heater, improved transistorized radios, Solex tinted glass, power radio antenna, captive-air tires, rear shelf radio speaker and rear window defogger.

Chrysler Windsor four-door hardtop

New Engines Featured by Dodge for '58



The 1958 Dodge Royal

DODGE MODELS FOR 1958

6-Cylinder Models		8-Cylinder Models	
Coronet	2-Door Sedan	Coronet	2-Door Sedan
	4-Door Sedan		4-Door Sedan
			2-Door Hardtop
			4-Door Hardtop
			Convertible Coupe
Custom Coronet	2-Door Sedan		
	4-Door Sedan	Custom Coronet	2-Door Sedan
			4-Door Sedan
			2-Door Hardtop
			4-Door Hardtop
		Royal	4-Door Sedan
			2-Door Hardtop
			4-Door Hardtop
		Custom Royal	4-Door Sedan
			2-Door Hardtop
			4-Door Hardtop
			Convertible Coupé
		Standard Station Wagon	2-Door 2-Seat Suburban
			4-Door 2-Seat Sierra
			4-Door 3-Seat Sierra Spectator
		Custom Station Wagon	4-Door 2-Seat Custom Sierra
			4-Door 3-Seat Custom Sierra Spectator

SIGNIFICANT advances in safety, engine performance and fuel economy, together with fresh styling treatment, distinguish the 1958 Dodge passenger cars. Dual headlamps are standard on all models. Dodge offers an extensive line of series and body styles, including station wagons as outlined in the table.

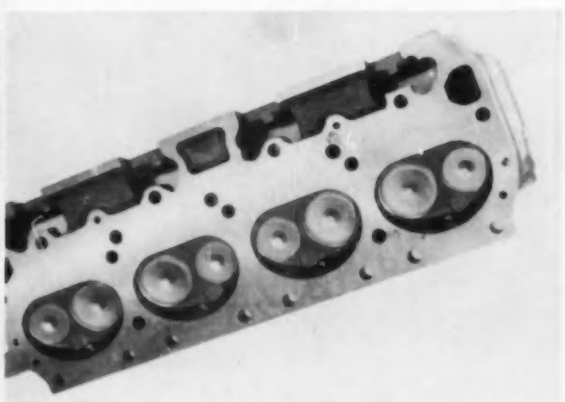
The major story is found in optional mechanical features as well as the introduction of new powerplants. Among the optional features are: a new full-time power steering gear, available on all cars equipped with TorqueFlite or PowerFlite automatic transmissions; the Sure-Grip differential; and the modified Bendix electronic fuel injection system offered with the Ram Fire D-500 engine package. This package also offers the option of dual, four-barrel carburetors.

The engine story is a big one this year. New this year is the "B-engine," the 350-cu in. Ram Fire V8, standard on all Custom Royal and station wagon models. A 361-cu in. version of this engine is available with the D-500 package. Ram Fire 350 has a single four-barrel carburetor as standard equipment. Lighter in weight than any engine of similar size, it is lower, requires less space under the hood, and is more accessible for servicing. It features a single rocker shaft for each bank and has in-line valves.

The 325-cu in. V-8 with double rocker shaft and lateral valve arrangement, standard in Coronet and Royal models, has a new combustion chamber configuration, with compression ratio increased to 9 to 1. The 230-cu in. Six is continued without change with a compression ratio of 8 to 1. It is available in

(*Turn to page* 95, *please*)

Cylinder head used on the new 350 cu in. engine



1958 DODGE V-8 ENGINE OPTIONS

For Passenger Car Models

Model	Royal and Coronet	Custom Royal	Station Wagon	D-500
Bore (in.)	3.69	4.06		4.12
Stroke (in.)	3.80	3.38		3.38
Displacement (cu in.)	325	350		361
Compression Ratio	9 to 1	10 to 1		10 to 1
Fuel System	Dual carb.	4-bbl carb.		Fuel Injection or two, 4-bbl carburetors

New Dodge Trucks with Increased GVW and GCW Ratings

The new Dodge T700 Power Giant is available in four different wheelbases and provides a maximum of 32,000 lb GVW. A 218 hp V-8 engine is standard.

FOR 1958 Dodge has groomed a freshly styled line of trucks for its new L-Series. To achieve special indentification, grilles of light and medium duty models are styled distinctively and separate treatment is given to heavy duty models. In addition, twin headlamps are offered as optional equipment on all models, except C-O-E's, Forward Control, and the W300M.

The Sweptside 100, introduced last year, has been given further eye appeal and has even more of a passenger car ride. It will carry up to 1675 lb of cargo.

In the lineup are the following basic models: Conventional — D-100, D-200, D-300, D-400, D-500, D-600, D-700, D-800, and D-900, ranging in GVW up to 30,000 lb for the D-900, and GCW up to 65,000 lb maximum. Six-wheel models include—T700, T800, and T900, the latter with GVW of 46,000 lb and GCW of 65,000 lb. There are three C-O-E models—C500, C600, and C700, the latter being rated 25,000 lb GVW and 50,000 lb GCW. Four-wheel drive includes five models—W100, W200, W300, W300M, and W500, the latter having a rating of 20,000 lb GVW. Forward Control has two models—P300 and P400, rated at 9000-lb and 15,000-lb GVW respectively. Rounding out the line are four school bus models — S400, S500, S600 and S700.

The big news is an increase in GVW and GCW ratings across the board, except on a few stipulated models. GVW is up as high as 4000 lb on one model—D800; and GCW has been upped as high as 10,000 lb on one model—T700.

Many noteworthy mechanical features are introduced. Among these are: a new double rocker-shaft V-8 engine for medium-tonnage models; as well as increased horsepower ratings for all medium- and high-tonnage V-8 engines. The result of this is given in the engine tabulation.

Improved hydraulic brakes, with lining area boosted as much as 110

(*Turn to page* 95, *please*)

1958 V-8 DODGE TRUCK ENGINES

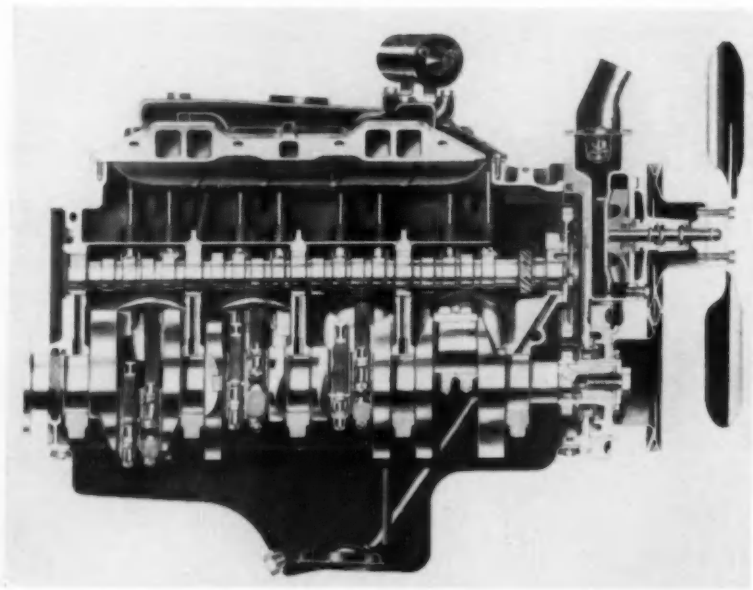
Brief Specifications and Availability

TRUCK MODEL—Std.	—	C500	C600	D700, T700, C700, S700	D800, T800	D900, T900
—Extra	D100, D200, D300, W100, W200, P300, P400	D400, D500, S400, S500, W300, W500	D400, D500, D600, S400, S500, C500, W500	—	—	—
Engine Type	Sgl. Rocker	Sgl. Rocker H. D.	Dbl. Rocker	Dbl. Rocker	Dbl. Rocker	Dbl. Rocker
Displacement—cu. in.		314 61			354	
Bore and Stroke—in.		3 63 x 3 80			3 94 x 3 63	
Max. Gross HP	204 @ 4400		207 @ 4400	218 @ 3900	224 @ 3900	234 @ 3900
Max. Gross Torque—lb. ft.	290 @ 2400		295 @ 2400	319 @ 2400	340 @ 2000	360 @ 2400
Compression Ratio	8 1 to 1		7.6 to 1	7.5 to 1	7 5 to 1	7.5 to 1
Carburetion	Single		Single	Single	Single	Twin

1958 SIX-CYLINDER DODGE TRUCK ENGINES

Brief Specifications and Availability

TRUCK MODEL—Std.	D100, D200, D300, W100, W200, P300, P400	W300 M	W300, D400, S400, D500, S500	W500, D600, S600	
—Extra	—	—	—	D500, S500	D600, S600
Displacement—cu. in.	230		250.6	265	
Bore and Stroke—in.	3 25 x 4 625		3 437 x 4 5	3 437 x 4 766	
Max. Gross Hp	120 @ 3600	113 @ 3600	125 @ 3600	130 @ 3600	141 @ 3600
Max. Gross Torque—lb. ft.	202 @ 1600	198 @ 1600	216 @ 1600	226 @ 1600	233 @ 1600
Compression Ratio	7.9 to 1	7 9 to 1	7.1 to 1	7 1 to 1	7.1 to 1
Carburetion	Single	Single	Single	Single	Twin



1958 PLYMOUTH

Model	318	318
Bore (in.)		$3^{29}/_{32}$
Stroke (in.)		3.31
Displacement (cu. in.)		318
Compression Ratio	9 to 1	9 to 1
Fuel System	Dual Carb.	4-bbl Carb.

Cross-sectional view of the 350 cu in. engine

Plymouth's Line of Cars for '58

THREE SERIES OF CARS—Belvedere, Savoy, and Plaza—along with a full line of suburbans—Sport Suburban, Custom Suburban, and Suburban—and the two-door hardtop Fury are offered by the Plymouth Division for 1958.

Highlighting new styling features and interior treatment, Plymouth will have dual headlamps as standard equipment.

Among the important mechanical features will be new V-8 engines, available with an option of the modified Bendix Electronic fuel injection system as a high performance package. Other optional features include the new Constant-Control power steering gear, and the Sure-Grip differential.

Both four-door and two-door sedans are available in all three series in six-cylinder or V-8 engine models. A common roof panel is shared by these models. The Plaza also offers a three-passenger business coupe. The Sport Coupe and Sport Sedan are available in both Belvedere and Savoy series. A convertible is offered in the Belvedere V-8 series. The Suburbans are mounted on a wheelbase of 122 in. and make available the rearward-facing rear seat to provide nine-passenger seating.

The new 318-cu in. V-8 engine is standard for all cars in the line, with a dual carburetor as standard equipment. However, this engine is available with a 4-barrel carburetor as part of an extra cost Power-Pak. For the Fury, this engine has two, 4-bbl carburetors as standard equipment.

The Golden Commando engine, introduced for 1958, has a displacement of 350 cu in. It will be offered in a special high-performance package with either two, four-barrel carburetors or fuel injection. Employing a single rocker shaft for each bank, this engine is extremely compact, lower in height, and weighs only about 640 lb. One of its major features is improved accessibility for servicing.

Unique design of the chrome alloy cylinder head produces a weight saving of around 50 lb per engine. It features extremely short exhaust ports, large openings around push-rods, and easier accessibility to the hydraulic valve tappets. In fact, the tappets can be removed through these openings without removing the intake manifold or tappet chamber cover.

In the wedge-shaped combustion chamber the squish area is formed by the piston dome at top dead center position. Intake and exhaust valve seats and guides are integral with the head. The horizontally positioned spark plugs are located at the wide end of the combustion chamber.

To reduce distortion and improve sealing the number of fastenings has been increased to 17, with five fastenings spaced symmetrically around each bore.

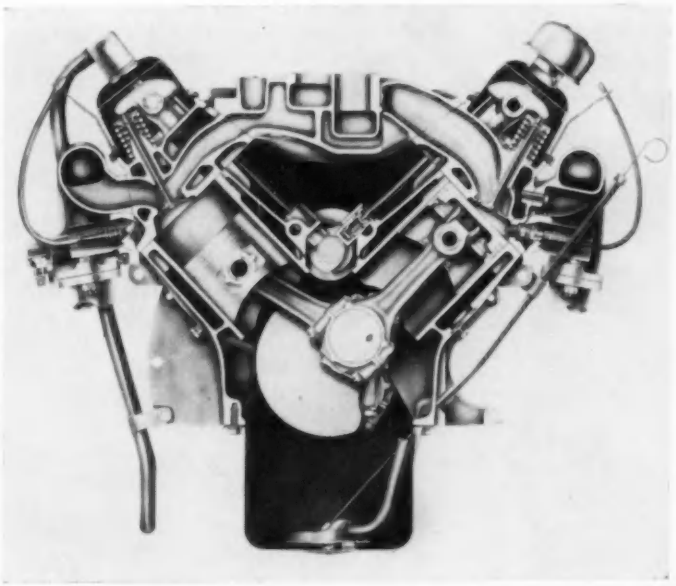
The forged steel crankshaft is extremely stiff, has a journal overlap of 13/16 in. A new high-speed fillet cutting technique provides smooth surfaces and eliminates need for shot-peening, thus reducing production cost.

The hardened cast iron camshaft is driven by a timing chain of ½-in. pitch, ⅞ in. wide. Thrust is taken by the rear face of the sprocket hub which bears directly on the front of the block, thus eliminating the separate thrust plate with its attachments.

Overhead valves, mounted at an angle of 30-deg from the vertical, are actuated by a conventional valve

V-8 ENGINE OPTIONS

Fury	350	350	350
		4.06	
		3.38	
		350	
9.25 to 1		10 to 1	
two, 4-bbl Carburetors	4-bbl	two, 4-bbl	Fuel injection



Cross-sectional view of 350 cu in. engine

train. Rocker arms are new, one-piece steel stampings, and are separated by means of Oilite spacers rather than springs. The tubular rocker shafts are mounted in five die-cast aluminum brackets.

A compact and light intake manifold is used in conjunction with a separate cover. The latter, an inexpensive stamping, also serves as the intake manifold gasket. The casting is divided into two separate but interconnected runners, each one supplied by two barrels of the four-barrel carburetor.

Exhaust manifolds are located on the outer sides of cylinder heads, immediately above the spark plugs. Unique separated-branch design makes gaskets unnecessary since the branches have sufficient flexibility to absorb distortion.

The 12-volt electrical system has a relocated position for the distributor, increased starting motor torque, and increased battery capacity. The double-breaker distributor now rotates counter-clockwise. It is mounted at the front of the engine, tilted outward 45-deg where ventilation is obtained from the fan.

Off-center spool type front engine mounts are standard on all V-8 engines.

Numerous important mechanical features, including Torsion-Aire ride are continued. TorqueFlite is available at extra cost on all V-8 cars. PowerFlite is offered at extra cost on all six-cylinder and V-8 cars, except Fury cars equipped with the high performance package. Push-button control for both automatic transmissions is continued.

Overdrive is available on all cars except the Fury and cars that specify the 350-cu in. engine.

Total-Contact brakes are continued, power brakes being made available at extra cost.

Two-way power seats are offered at extra cost. Seat belts are available as a dealer-installed option. Electric window lifts are available at extra cost on all models except the business coupe and two-door Suburbans.

The new "Constant Control" power steering, Sure Grip differential, and fuel injection were described in AUTOMOTIVE INDUSTRIES, October 15, page 52.

New Belvedere Sport Sedan

Pontiac Adds New Models to Line

Five-passenger Bonneville sport coupe

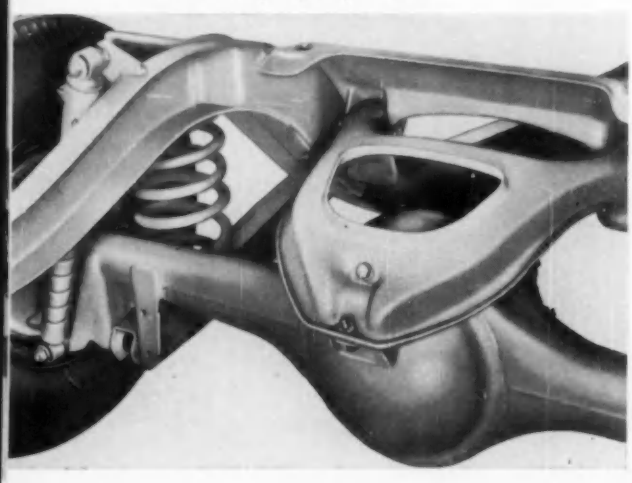
SIXTEEN models in four series are presented by Pontiac in 1958. A new body, new chassis, new "Tempest 395" V-8 engine, new optional equipment and a new Bonneville series are features of the line.

In addition to the five-passenger Bonneville convertible and the sport coupe, there is the Star Chief series consisting of two and four-door Catalinas, a four-door sedan with slim center pillar, and a custom Safari station wagon. The Super Chief line includes two and four-door Catalinas and a slim pillar, four-door sedan. The Chieftain series is led by the convertible, new in this line; two and four-door Catalinas, two and four-door slim pillar sedans, and a two-seat and a three-seat, four-door station wagon.

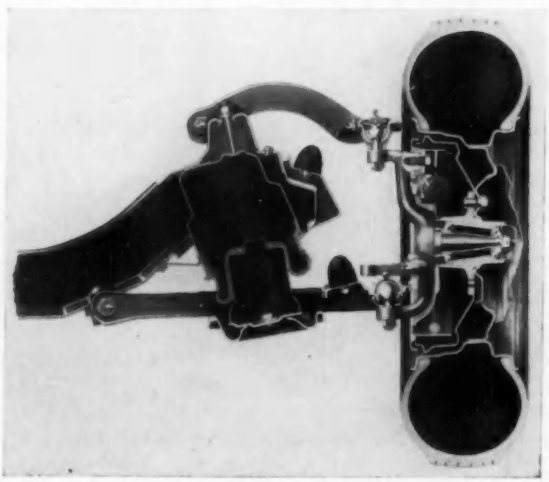
On 122 in. and 124 in. wheelbases, the new cars are as much as 4.5 in. lower in height, are 2.2 in. wider and as much as 8.7 in. longer overall. Passenger leg room has been increased by 4.5 in., ample headroom is retained and luggage space is enlarged. A new tubular X-frame has contributed to lowering the overall height of the cars.

The basic Pontiac V-8 engine has been upped to 370 cu in. displacement. Bore is 4.06 in., stroke 3.56 in. The accompanying table shows variations in bhp and torque ratings for car models in the line incident to options in fuel induction

Rear coil spring suspension



Sectional view of front air suspension



systems being offered for 1958.

New this year, and available for all 1958 models, an air ride suspension provides an ever-level ride of superior softness regardless of conditions.

Consisting of air springs at each wheel which automatically compensate for load or road conditions, the system includes an air compressor operated off the crankshaft and an accumulator tank. This accessory is factory installed.

Pontiac introduced fuel injection last year, and offers an improved system this year for all models with Hydra-Matic transmission.

A non-slip safe-t-track differential, designed to deliver the power to the wheel with traction, is a new accessory for 1958. It is most useful in snow, ice, sand or mud and also prevents spinning of the free wheel on rough roads and non-uniform surfaces.

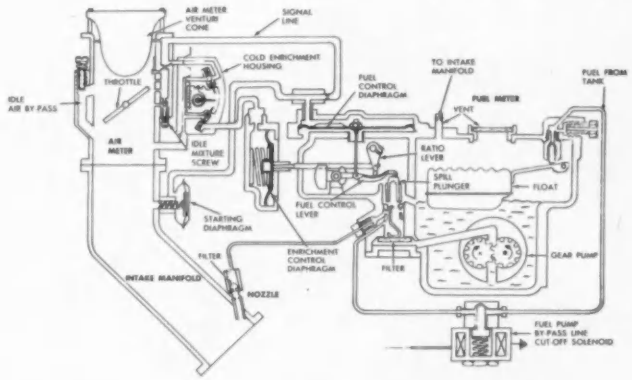
Front-mounted air conditioning this year is combined with the heater to provide year-round climate control in the car. Either can be used, depending on the temperature, and new outlets have been designed for better flow of conditioned air to all sections of the passenger compartment.

The 1958 heater is dash-mounted, replacing the former underseat type.

The Hydra-Matic transmission and power steering have both been improved this year. The automatic transmission has been modified to operate with maximum efficiency with the new, larger engine, and improved to shift more efficiently at any temperature.

A four-way power seat with a "memo-matic" control device, which returns it to a pre-selected setting; a "safeguard" speedometer, which buzzes when a set speed is exceeded; a split front seat back lock to prevent seat tilt on sudden stops; and a new door lock warning lamp are optional extras.

Dual exhaust systems, featuring a muffler and resonator in each, power window lifts, and power brakes are other popular accessories.

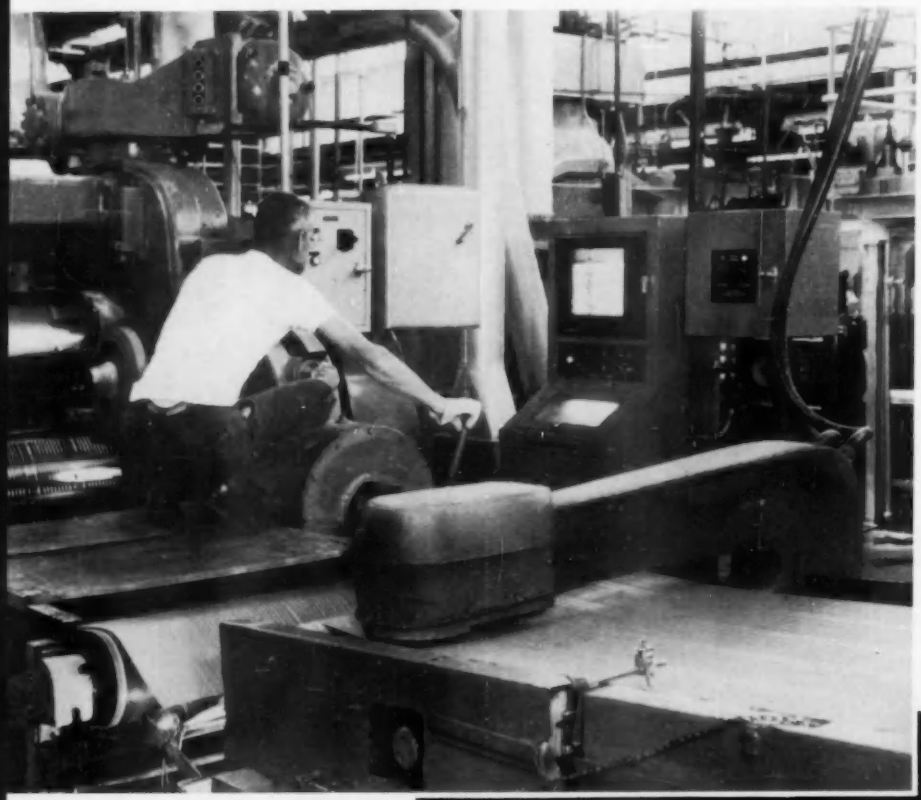


Schematic illustration of the fuel injection system

MAXIMUM HORSEPOWER AND TORQUE FOR 1958 ENGINES

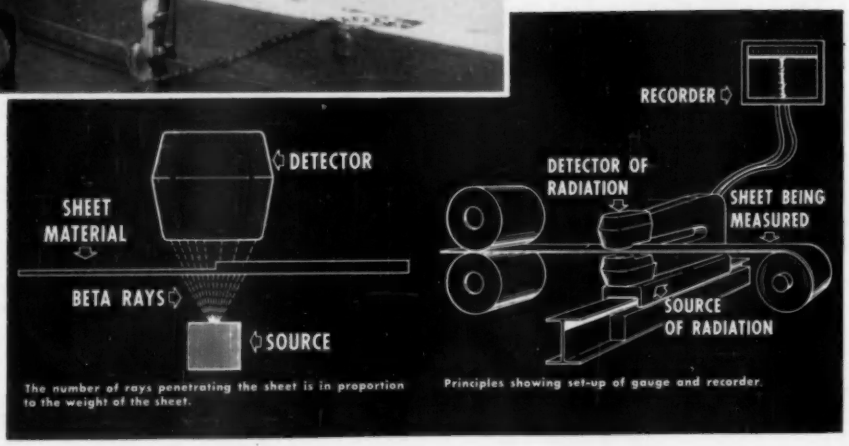
Car Models or Special Engine Description	Transmission	Compression Ratio	Induction System	BHP	Torque
Chieftain and Super Chief	SM	8.6:1	2-bbl.	240 @ 4500	354 @ 2600
Star Chief and Bonneville	SM	8.6:1	4-bbl.	255 @ 4500	360 @ 2600
Premium Fuel SM Engine	SM	10.0:1	4-bbl.	285 @ 4600	395 @ 2800
Chieftain and Super Chief	HM	10.0:1	2-bbl.	270 @ 4600	388 @ 2800
Star Chief and Bonneville	HM	10.0:1	4-bbl.	285 @ 4600	395 @ 2800
4-Barrel Carb. Opt.— Chieftain and Super Chief	HM	10.0:1	4-bbl.	285 @ 4600	395 @ 2800
Triple Carb. Option— All Models	SM or HM	10.5:1	3, 2-bbl.	300 @ 4600	400 @ 3000
Fuel Injection Option— All Models	HM	10.5:1	Fuel Injection	310 @ 4800	400 @ 3400

The new Pontiac chassis



A Geiger type counter mounted in the large unit in the foreground measures the number of beta rays penetrating the soft rubber sheet. This information is translated into thickness measurements and recorded in the unit at the right. By watching the recorder, the operator can determine when adjustments are needed. A lever being used by the operator controls the setting of the calender mill rolls seen on the left. The setting of calender rolls determines thickness of the rubber sheet.

Schematic illustration of the equipment to detect and record thickness variations in rapidly moving sheet of soft rubber.



Atomic Instrumentation at Delco-Remy Battery Plant

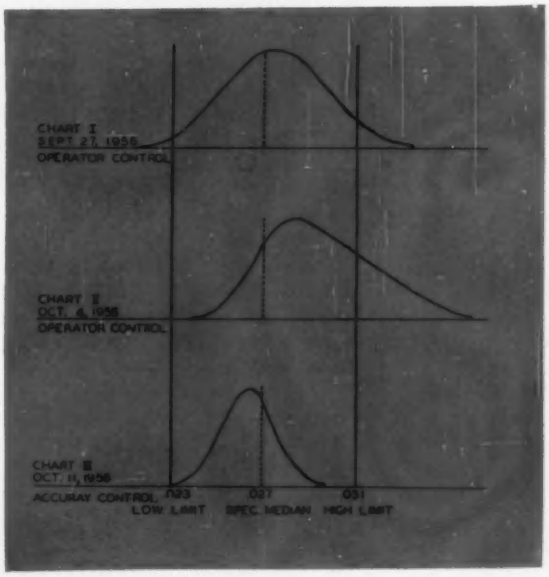
An atomic instrument capable of making micrometric readings of scientific accuracy is enabling the Delco-Remy Division of General Motors to better control the processing of battery separator materials and at the same time provide improvements in storage battery performance.

The instrument is a radioisotope gage which uses nuclear radiation to detect and record thickness variations in a rapidly moving sheet of soft rubber. The Delco installation, unique in the battery business, is an adaptation of the Accuray equipment manufactured by the Industrial Nucleonics Corp. of Columbus, Ohio.

The secret of the new gage is connected with the

The continuous thickness record provided by the beta ray gauge is an important aid in studying the process. Effects of small adjustments can be seen immediately.

Battery separator thickness quality control charts.



behavior of beta rays. These rays will penetrate most known substances, but in doing so they lose energy in proportion to the mass per unit area of the material through which they pass. Changes in the amount of energy received through the material are measured by the detector unit, and recorded as variations in thickness.

Introduction of this new method of continuous non-destructive inspection has helped Delco engineers solve one of their most difficult manufacturing problems. The problem stems from the fact that spongy freshly calendered rubber cannot be dependably measured by standard methods. At Delco and at other battery plants manufacturing microporous rubber separators, it had always been necessary to delay any accurate measurements of the separator until after it had passed through the curing cycle. This delay made it difficult to prevent the running of some off-specification production. The problem was not fully solved until the introduction of nuclear gaging at the Delco Battery plants last year. With the new instrument it is possible to inspect, measure, and control separator thickness as the embossed sheet comes off the calendering rolls.

Use of the device has enabled Delco-Remy to hold tolerances impossible a year ago. The device reads thickness to 0.0001 in. with an error of less than one per cent.

The full picture of what continuous nuclear measurement has done for the Delco people can best be seen in an examination of quality control records before and after the installation. Charts I and II show typical runs before the introduction of the isotope gage. Although in both cases the process was well under control, considerable day to day variation is obvious and areas for improvement can be noted.

Before the introduction of nuclear measurement the operators made an "educated guess" as to final separator thickness. Measurements were made on the selvage edge of the 32-in. wide freshly calendered strip. Measuring this resilient selvage and interpreting the results in terms of final thickness of the hard microporous separator called for a high degree of skill. Results predicted by two experienced operators might vary considerably. This threw an undue burden on inspection and increased the cost of the finished product.

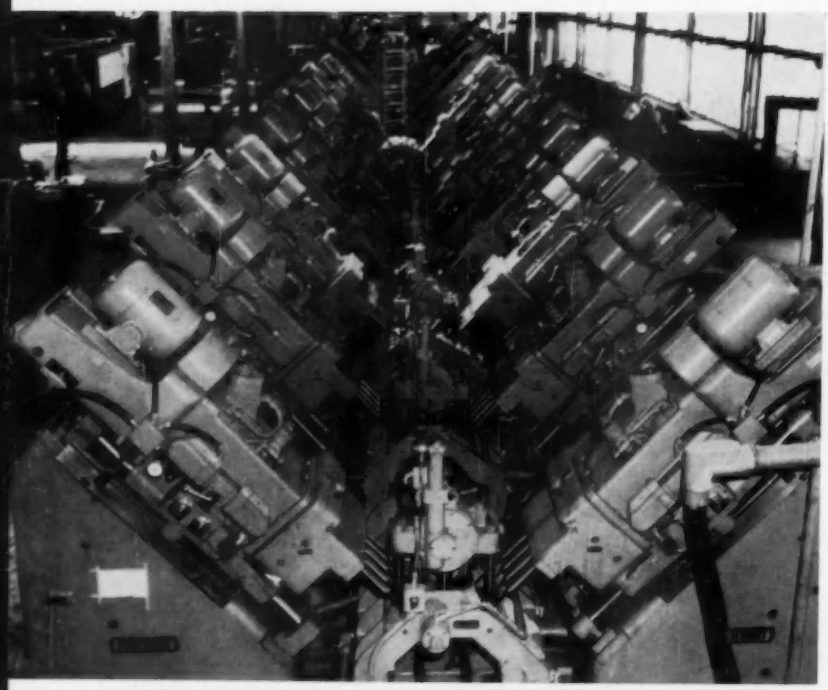
The charts show that under the old system separator thickness tended to vary toward the high end of the specification. Operators purposely held to the high side to avoid running scrap since anything falling outside the low limit could not be salvaged. While operating on the high side was effective in eliminating scrap, the relatively low yield in square inches of separator per pound of raw material was an important factor in separator cost. The charts showed that if the process could be brought under complete control, the specification tolerances could be tightened and impressive material savings could be effected. Furthermore, thinner separators would show important consumer benefits since they would offer less electrical resistance making for a more responsive battery. The search for a way to control separator thickness took the better part of two years before it finally came to an end with the discovery of a practical peacetime use of atomic energy based on a radio-

(*Turn to page* 93, *please*)

By
JAMES
MONTAGNES

Canada's Automobile Industry

LAST year Canadian automobile factories produced 474,276 passenger cars and trucks, the highest number on record. In the first seven months of this year production totaled 299,047, compared with 325,881 cars and trucks in the same period of 1956.



A recent addition to the equipment at the Ford of Canada Windsor plant is this 17-station, 80-spindle unit, which automatically drills, chamfers and reams the 16 tappet holes in the cylinder block.

The Canadian automobile industry has been producing cars at peak levels for some years. Largest producer is General Motors of Canada with 188,808 cars and trucks in 1956, followed by Ford Motor Co. of Canada with 148,866 cars and trucks, Chrysler Corp. of Canada with 104,891 cars and trucks, International Harvester Co. of Canada with 15,872 trucks, Studebaker-Packard of Canada with 8682 passenger cars, and American Motors (Canada) with 5584 passenger cars.

Other cars are sold in Canada but not made in the country, being imported from the United States, Great Britain, Germany, France and Italy. The higher priced cars of the big three manufacturers are also imported from the United States as are some of the higher priced cars of Studebaker-Packard and American Motors.

In the past decade Canadian motor car manufacturers and parts suppliers have spent upwards of $300 million on new plants and equipment to meet the growing demand for cars and trucks. There are now about 4.5 million cars and trucks registered in Canada for a population of about 16.5 million. The Canadian Automobile Chamber of Commerce estimates a motor car for every 3.8 persons in Canada, a passenger car for every 5.1 persons.

With most of Canada's population in eastern Canada, it is not surprising that the major automobile factories are located in southern Ontario, in an area of about 275 miles from Windsor, opposite Detroit, to Oshawa, in southern Ontario. Here also sites have been purchased for new plants for American Motors and Studebaker-Packard, and distribution of foreign cars is also centered in this region. Toronto is the focal center of the Canadian automobile industry today, primarily because about one-quarter of the car users of Canada are located within 25 miles of Canada's second largest city. The province of Ontario accounts for almost half the new cars and about one-third of the trucks sold in the country.

Practically all Canadian automobile manufacturers have distribution and parts depots throughout Canada. Some of these have been built only in recent years, such as Chrysler's new parts plant and regional sales building completed this year at Vancouver on the Pacific coast, and Ford's new parts depot built last year at Edmonton, Alberta. There are no major cities in Canada without a distribution depot of at least one Canadian automobile manufacturer.

Major expansion in recent years, however, has been at plants at Windsor, in the Toronto area, and at Oshawa. At Windsor, Chrysler has all its manufacturing facilities, covering over 350 acres with 57 acres under roof. Over $55 million has been spent

Operating at Record Level

here on plant expansion in recent years, including a $28 million engine plant which went into production in 1955. The company began its Canadian operations here in 1925 and the present truck plant is located on the site of the original Canadian factory. Chrysler last year purchased some 200 acres of land nearby its present factories for future expansion.

Ford of Canada did its major manufacturing at Windsor until 1953. That year it opened a new assembly plant at Oakville, a suburb of Toronto. The Ford Windsor facilities cover an area of 240 acres with 59 acres under roof, have five miles of railway track, 11 miles of roads and 15 miles of conveyor lines. Here are made engines, axles and pressed steel components. The plant includes a foundry with one of the largest electric furnace installations in Canada. The Oakville assembly plant, built at a cost of about $35 million, covers 36½ acres under one roof; the largest building of its type in Canada. Here all Ford Motor Co. cars, except Lincolns, are produced for Canadian and export sale. Production of Edsel cars started in July, replacing Canadian Monarch passenger cars. Ford makes Meteor cars here also.

At Hamilton, about 40 miles west of Toronto, Studebaker-Packard has its production headquarters, and some 80 cars can be produced daily. There has been no major expansion since 1953, the plant operating at about 50 per cent of capacity at the end of the 1957 model year. For future growth, the company has a 90 acre factory site at Burlington, close by Hamilton. No plans for building a new plant have been announced as yet.

At Toronto, American Motors has been operating for a few years in a former plant of Ford of Canada. This plant has now been closed and a new factory is planned for early construction in the Toronto area. The new plant is to be ready by late 1958 and will make cars for Canadian and export sale to the sterling currency areas. A parts warehouse is now nearing completion in eastern Toronto and is to be ready by the end of this year. Meanwhile American Motors is importing cars from its parent plant at Kenosha, Wis., and from its English plant.

At Oshawa, some 35 miles east of Toronto, General Motors has its Canadian production center. Including the latest addition, the plant now covers 125 acres under

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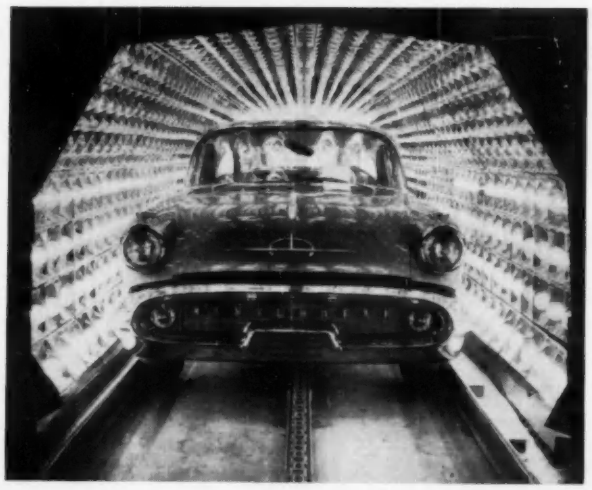
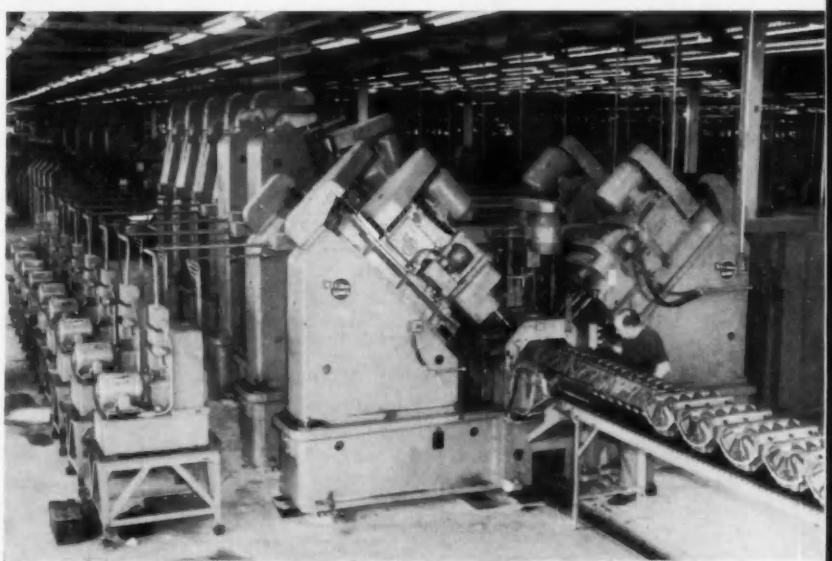


Both infra-red and steam heat are used for rapid drying of final paint coats on new automobiles at General Motors of Canada's Oshawa plants. The 1957 Oldsmobile shown above is passing through a tunnel lined with infra-red lamps which dry the car's paint from the inside outwards. It will go from there to a steam heated drying oven which will bake the paint on the outside.



A machine which performs five separate drilling operations on engine blocks is pictured in the new Chrysler of Canada V-8 engine plant at Windsor. The machine is part of the new plant's $20 million complement of new machine tools.

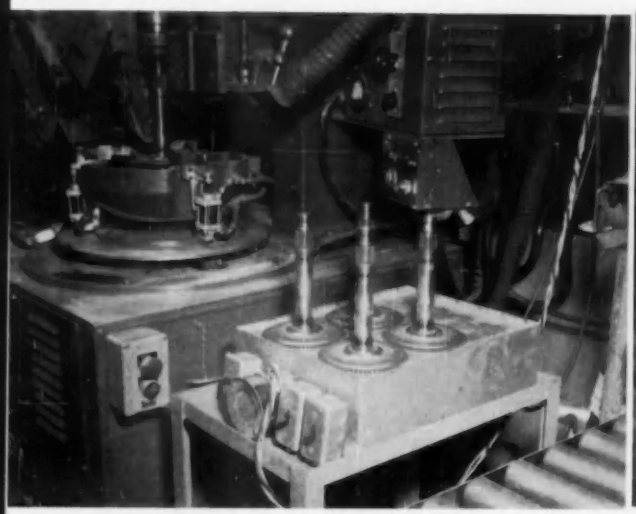


Fig. 1—Setup in which semi-finished turbo-transmission shafts of alloy steel provided with stamped flanges are heated to 400 F on the hot plate in foreground and then are joined by automatic submerged arc welding in the fixture of the machine using a Lincolnweld head.

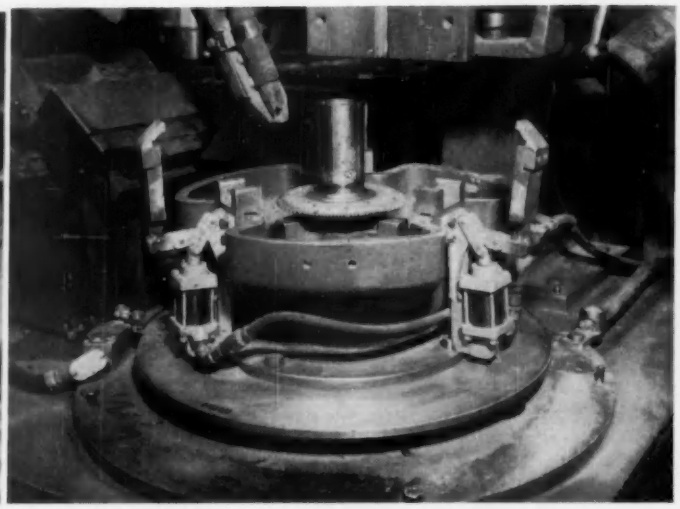


Fig. 2—In this fixture, on the same machine shown in Fig. 1, a transmission sun gear assembly, that includes a hollow shaft and a stamped flange, has the two parts joined by a fillet weld.

Improved Arc Welding Methods at Allison Division of GM

MANY improvements in arc welding have been put into use by Allison Division of General Motors Corp., Indianapolis, in recent months. These have resulted not only in economies, including higher welding rates, but in welds of superior quality.

In certain and quite significant cases, parts that normally would be forged in one piece are now made in two pieces that are joined by automatic submerged arc welds with substantial savings, especially in machining operations. This applies especially to the joining of stamped flanges to shafts to produce transmission components after the two parts have been machined close to finished size with much less stock removal and higher machining economy than for one-piece forgings.

Before welding, both parts are machined close to finished size and are clamped in a welding fixture that holds them in correct relative position. After welding, only light finishing cuts are required, and they can be made at high speed. These assemblies are for a new turbo-transmission for use in light trucks and are not unlike corresponding parts in some automatic transmissions for passenger cars, although present production is on a much smaller scale.

Each part of this type involves either a hub or shaft, which can be machined at a high rate in a tracer lathe, using alloy steel such as SAE 4130. Flanges are circular and are blanked, pierced and formed from plate stock, usually from SAE 1010 steel. They require relatively little machining except where teeth are required on the periphery. These teeth would be needed also, if a forging were used.

After machining, the parts are placed together with a turned diameter of the shaft or hub fitting into a mating hole in the flange. If alloy steel is required, the parts are set on a hot plate, as in Fig. 1, and are preheated to 400F before being placed in the welding fixture in the automatic welding machine, background in Fig. 1. There, air clamping is done after the shaft is placed vertically between centers. This insures that the two parts are held in correct relative location.

When the parts are locked in the fixture, the joint, where a fillet weld is to be made, comes opposite the ⅛-in., L-60 mild steel electrode wire that is to be fed through the Lincoln Electric submerged arc head, whose hopper feeds No. 840 flux to cover the arc. Settings are such that a welding current of 450 amp at 28-30 volts is used. Welding speed is 55 ipm. This speed is determined by the speed of rotation of

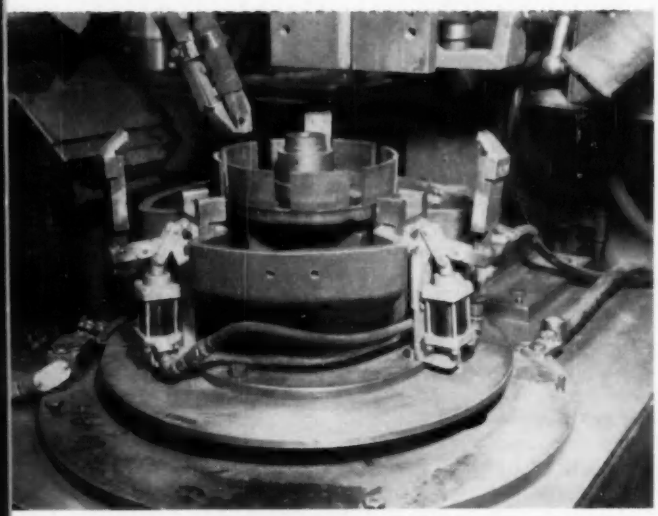


Fig. 3—Air clamping fixture in the machine that makes an automatic circumferential submerged arc fillet weld to join the hub of a "high" transmission clutch to a housing as the two components are rotated.

the fixture and the work piece which start to turn the instant the electrode contacts the work.

Deep penetration results from the high current density, and high strength fillet welds are produced. In general, there is little or no warpage, but the flanges shown in Figs. 1 and 2 are coined flat in a 70-ton press after cooling. Then the assemblies are ready for final machining, only light cuts being required. Output approximates 35 pieces an hour.

Substantially duplicate work is done in joining the flange and hollow shaft of the transmission reverse sun gear assembly, Fig. 2, and in welding a transmission "high" clutch hub to a housing, Fig. 3. Each of these assemblies, of course, requires its own rotating fixture which air clamps the components in correct relative position. For the parts in Figs. 2 and 3, it is not necessary to use centers because the fixtures alone center the parts with their axes coinciding with that of rotation.

Welding in the setups described above is done in an area where other transmission parts are produced, but much other welding, chiefly on larger parts, is done in a weldery constituting a separate department. This department uses several automatic arc welders, adaptable to a variety of work, and some flash welders, but does also some work with semi-automatic "Squirt" guns and considerable hand welding in which coated electrodes are employed.

Among the jobs done with a Lincoln "Squirt" welder is that shown in process in Fig. 4. This involves cylindrical shells for locomotive generators that formerly were cast, but now have a shell rolled from heavy steel plate. Ends of the plate to be joined are beveled on both sides and the interior, having a 3/8-in. scarf, is welded with the "Squirt" gun using 5/64-in., L-60 wire and No. 840 flux.

This welder affords high penetration (about 1/8 in.) because of high current density, and is faster than ordinary hand welding. Moreover, the shell is easily positioned and the operator can move along the conveyor shown at will. After this weld, the shell is

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By Herbert Chase

Fig. 4—Using a Lincoln "Squirt" welder to make the internal longitudinal submerged arc weld at the joint of an alternator rotor spider shell. Fast welding and good penetration are attained.

METAL SHOW
Will Be Largest Ever Held

CHICAGO will play host this month to an estimated 50,000 visitors attending the 39th National Metal Exposition and Congress. The Congress will have its opening session on November 2, and the Exposition will open on November 4, with both continuing through November 8.

Sponsored by the American Society for Metals, "the largest Metal Show in history" will contain nearly 500 exhibits of leading manufacturers and suppliers. The displays will occupy 320,000 sq ft of floor space, all on one level, in Chicago's International Amphitheatre. A preview of many of the items to be exhibited is given on the following pages.

Technical societies participating in the comprehensive program of the National Congress are: American Society for Metals; Institute of Metals Div., American Institute of Mining, Metallurgical and Petroleum Engineers; Special Libraries Association, Metals Division; Society for Nondestructive Testing; Industrial Heating Equipment Association; and Metal Powder Association.

Metallurgical Congress

The 2nd World Metallurgical Congress is also scheduled for November 2 through 8, and its sessions will be part of the overall program. A recent listing of enrollees for the WMC indicates that more than 500 top metal scientists from 40 nations will attend the conference.

To be held at the Hotel Sherman, the WMC program will have 20 panels during which some 40 papers will be presented. Panel topics are: Heat treatment; Welding and joining; Metal fabrication; Non-ferrous refining and fabrication; Steelmaking and refinery; Metallurgical research and education; Metallurgical aspects of atomic energy; and Inspection and testing. In the Metal Fabrication session, dealing with the machining of steel, a paper "Approach to the Problem of Machinability" will be given by M. E. Merchant, Cincinnati Milling Machine Co. Another outstanding paper to be presented in this session is entitled "Microstructure as Related to Machinability of Common Constructural Steels," authored by A. H. Smith, Cadillac Motor Div., General Motors Corp.

In the WMC Inspection and Testing Session, quality control of semi-finished products and components will be discussed. Wrought materials will be covered by W. H. Mayo, U. S. Steel Corp., R. S. Pratt, Bridgeport Brass Co., and J. W. Hood, Aluminum Co. of America. Cast materials will be the category covered by A. Karam, Central Foundry Div., General Motors Corp. Quality control in component manufacture will be discussed in the automotive and aircraft fields respectively by W. H. Grundeman, Chrysler Corp., and R. A. Day, Blackburn and General Aircraft, Ltd., and B. R. Swarts, Convair Div., General Dynamics Corp.

ASM Sessions

Sessions of the American Society for Metals will be held at the Palmer House, starting with a seminar November 2 on the subject of "Liquid Metals and Solidification." A number of the sessions will be jointly sponsored by ASM and the U. S. Atomic Energy Commission. In addition to various phases dealing with steel and aluminum, the ASM sessions will discuss zirconium, plutonium, titanium and uranium.

Illustrative of the papers in the ASM program are: "Some Relationships Between Torsional Strength and Electron Microstructure in a High Carbon Steel" by S. T. Ross, R. P. Sernka and W. E. Jominy, Chrysler Corp. "Precipitation Hardening Aluminum-Base Alloys" by W. A. Anderson of Alcoa Research Laboratories. "Study of the Role of Carbon in Temper Embrittlement" by E. B. Mikus of General Motors Research Staff and C. A. Siebert, University of Michigan. "Studies on the welding of Type 347 Stainless Steel" by V. N. Krivobok, International Nickel Co. "Effect of Microstructure and Heat Treatment on the Mechanical Properties of AISI Type 431 Stainless Steel" by G. E. Dieter, E. I. du Pont de Nemours & Co.

Institute of Metals Division

The Institute of Metals Division, American Institute of Mining, Metallurgical and Petroleum Engineers, will play a large part in the program. All of its sessions will be held in the Hotel Morrison, beginning November 4. There will be a seminar on the structure of solid solutions, and a symposium on the relation of structure and high-temperature properties of steels and alloys. Deformation and oxidation, titanium metallurgy, and nonferrous and high-temperature alloys will also be subjects of some of the many sessions. Research summaries on the science of metal hardening; a symposium on uranium and uranium dioxide; a symposium on powder metallurgy; and nuclear metals will also occupy important places on this program.

Industrial Heating Equipment Association

On November 5 the Industrial Heating Equipment Association will sponsor a session having as its theme "Modern Heating Equipment Speeds Metallurgical Proc-

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What's NEW at the

NATIONAL METAL SHOW

CHICAGO
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FOR ADDITIONAL INFORMATION
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Hardness Testers

Latest advances in hardness testing of metals, including fully automatic console and floor model hardness testers, will be featured in one exhibit which will display a large range of equipment. By using tiny photo transistors and precision timing mechanisms the automatic Rockwell testers are capable of testing the hardness of both ferrous and nonferrous metals, in hard or soft condition, at the rate of 1000 parts per hour.

Another featured unit will be a motorized Rockwell hardness tester which is semi-automatic in operation. Known as the model YR, the device features a short test cycle. A special dial gage, designated as the Set-O-Matic, eliminates the necessity of the operator setting the dial bezel for each test. *Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc.*

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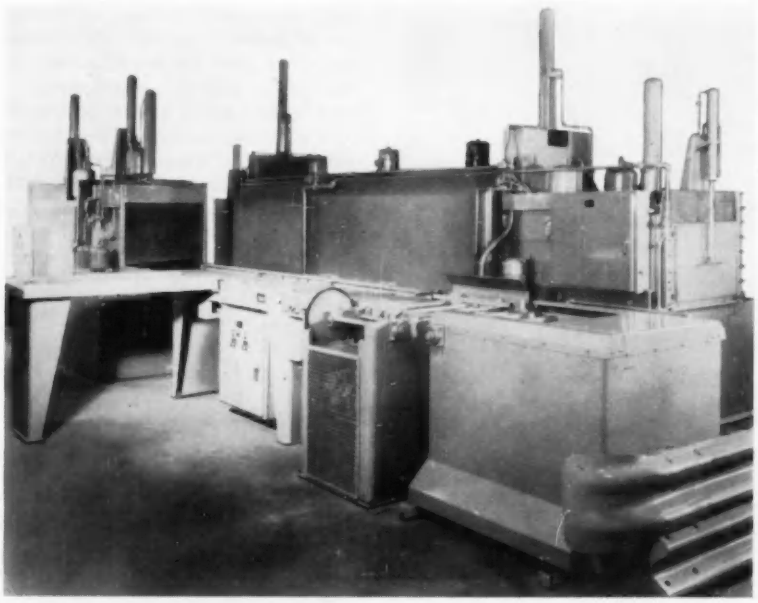

Ipsen new "B" Model P-6-3030 pusher tray production heat treating furnace

Continuous Production Heat Treat Furnace

Featured in one exhibit will be the new "B" Model P-6-3030 pusher tray furnace with integrated oil quench and self-purging charge vestibule. Serviced at each end by Ipsen semi-automatic loader and unloader equipment, an adjacent line will incorporate immersion washer, draw furnace, and service area for loading and unloading of process parts. Ipsen generators will permit use of the equipment for neutral bright hardening, bright gas carburizing or carbonitriding.

Built for bright production carburizing, the first zone has initial heating capacity of 1000 lb of steel per hour. Two additional zones afford soaking interval control. All zones are designed for full forced-circulation heating. *Ipsen Industries, Inc.*

Circle 26 on postcard for more data

Ultrasonic Cleaner

Introduction of the new Sonogen Model R-50 self-contained ultrasonic cleaner will be made at the show. It includes a heater, temperature control, filtration and recirculation system, in addition to the ultrasonic generating equipment. Overall dimensions of the unit are 22 by 19 by 37 in. high. Piping, pump and filter are of stainless steel, with Teflon gaskets, making the cleaner suitable for alkaline solutions, solvents, and mild acids.

Size of the tank is 6 by 16 by 11 in. deep, with a total working volume of five gallons. The transducers, mounted to the bottom, have a rated input of 250 r-f watt average (1 kw peak), which is converted into mechanical vibrations at 38 kc. *Branson Ultrasonic Corp.*

Branson Sonogen model R-50 self-contained ultrasonic cleaning machine

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What's NEW at the NATIONAL METAL SHOW

CHICAGO
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FOR ADDITIONAL INFORMATION
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Abrasive Cutting Units

Many of the newest techniques in wet and dry abrasive cutting will be demonstrated in one exhibit which will combine cutting equipment and abrasive wheels. Three of the company's latest machines will be in operation, including the Model 28 dry-abrasive unit which has a capacity to handle solid steels up to four-inch square, six-inch angles, eight-inch channels at 90-deg to axis, and four-inch diameter pipe or tubing. This unit is equipped with power feed wheel, power oscillation, and air-operated work clamps for high output. Wheel oscillation permits cutting of large sections without burn at the rate of two to five seconds per square inch.

Also in operation will be the Model 64 oscillating wet-abrasive Cutamatic which has the ability to cut up to three-inch diameter steel bars, four-inch OD tubing, and six-inch by one-inch plate at the rate of 6 to 10 sec per square inch. The other model to be exhibited is the 406 oscillating wet-abrasive cutting machine. This unit cuts steel bars and tubing up to six-inch diameter at the rate of 6 to 10 sec per square inch of metal cut.

In the same booth will be a display of the complete line of Allison wheels up to 34 in. diam and capable of cutting through steel billets up to 12 by 12 in. *Campbell Machine Div., American Chain & Cable Co., Inc.*

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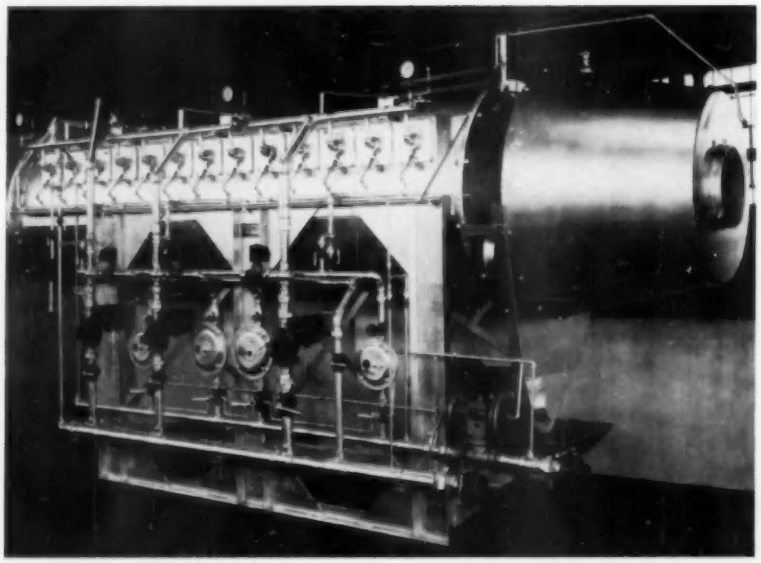


AGF Model 139-MDN controlled-atmosphere continuous-type rotary retort furnace

Automatic Heat Treating Furnace Installation

In operation at the show will be a newly-developed, completely automatic heat treating furnace installation. The equipment comprises a loader, a Model 139-MDN controlled-atmosphere continuous-type rotary retort furnace (illustrated), and an automatic conveyorized quenching tank. The work will automatically discharge from this equipment into a Metalwash automatic washing machine and tempering furnace.

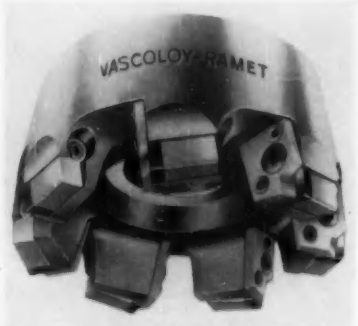
The automatic rotary retort furnace installations are available in capacities of from 100 to 2000 lb per hour. The tumbling action of the slowly-rotated retort mixes the work so each piece is uniformly heated and subjected to the action of the controlled atmosphere. Incorporated are new combustion systems permitting operation at temperatures from 600 to 1850 F. *American Gas Furnace Co.*

Circle 29 on postcard for more data

Band Saw Blade

The new Safe-Flex high-speed-steel band saw will be one of the featured items in a company's display. Reported tests indicate it will cut at rates up to 10 times faster with cutting life up to 30 times greater than regular blades, when used on machines designed for high-speed-steel band saws. Improved methods for its manufacture are said to result in a continuous cutting tool having extremely hard teeth, combined with a back that has flexibility and toughness. Thickness of the new bands range from 0.025 to 0.042-in., and they are available in regular, hook-tooth and skip tooth types in four widths and a variety of pitches. The company recommends them for cutting tool and die steels, all ferrous alloys including carbon steels, free machining steels, alloy steels, tool steels, stainless steel, as well as titanium and other hard-to-cut metals. *The L. S. Starrett Co.*

Circle 30 on postcard for more data



Cutting Tools

New face milling cutters incorporating the use of throw-away inserts will be one of the featured items in a complete line of cemented carbide and Tantung tools, blanks, toolholders, inserts, etc., to be displayed. Also to be presented is a pictorial story of the manufacture of cemented carbides from ore to finished product. (Vascoloy-Ramet Corp.)

Circle 31 on postcard for more data

Metallurgical Microscope

Being shown for the first time will be the Metalstar Series 2200 metallurgical microscope. Featured is the Micro-Glide circular stage that permits rapid, precise specimen positioning under the objective in any horizontal direction. Four interchangeable, rotatable (to 360-deg), inclined bodies are available—monocular, binocular, trinocular, and special monocular photographic. An accessory 35-mm camera is mountable on the trinocular or photographic monocular body. The vertical illuminator provides an intense light source which is controllable by aperature and field diaphragms. Combinations of eyepieces and achromatic coated objectives can be selected to provide a series of resultant magnifications. *American Optical Co.*

AO Metalstar series 2200 microscope

Circle 32 on postcard for more data

Specialty-Steel Products

One-piece expanding piston rings, steel measuring tapes, and bandsaw blades will be displayed in one exhibit as examples of high-quality products formed from cold-rolled specialty steels. Also on display will be various flat springs and other types of precision mechanical springs fabricated from the same specialty steels.

Visitors to the exhibit will be able to watch the production of components on a stamping press and a four-slide forming machine, both of which will be in continuous operation during the show. In addition, a number of die strips will illustrate the sequence of forming using progressive, multi-stage dies. *Associated Spring Corp.*

Circle 33 on postcard for more data

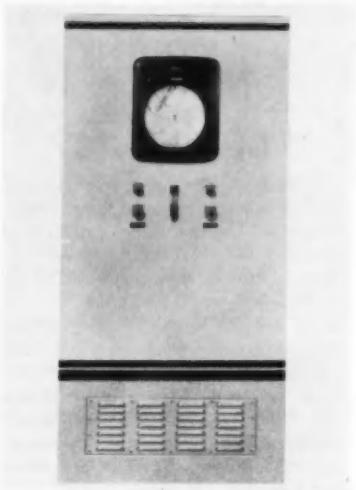
Two-Spindle Nutsetter

An operating display will include a new two-spindle nutsetter unit which feeds and runs down wing nuts automatically, using integral air-driven nutsetters with nut-tension control. Parts to be assembled are placed under the unit and this automatically activates the machine by means of air valves. An electrically-driven vibratory unit feeds two wing nuts into position and the machine's two air setters run down the wing nuts. Torque is controlled by a Thor air regulator which prevents overdriving the nuts or breaking the studs. The multiple is also so controlled that the nutsetters are automatically raised when the nuts are driven. The machine can be mounted on a bench or table. *Thor Power Tool Co.*

Circle 34 on postcard for more data

Dew Point Controller

Newest instrumentation for the metal processing field to be displayed will include a dew point controller for governing the moisture content of the gas atmosphere in heat treating furnaces. The cabinet-mounted unit consists of a Dewcel measuring element, gas compressor, sample cooling system and a control valve. By continuously sampling furnace atmosphere, the Dewcel element provides an accurate dew point measurement which is recorded on a circular chart for inspection. From this measurement the controller positions a gas or air valve located in the inlet of the gas generator, admitting the desired quantity of air or gas to govern the moisture content of the furnace atmosphere. *The Foxboro Co.*



Foxboro controller improves heat treating by controlling to —30 F dew point

Circle 35 on postcard for more data

Electrolytic Oscillating Carbide Tool Grinder

In operation will be this Hammond Model SCE-6 electrolytic oscillating grinder and Anocut power pack for grinding carbide tools. The grinder eliminates manual tool oscillation by an oscillating spindle. The oscillation has two variables — both controlled by hand-wheels — for stroke length and for stroke frequency. Using the electro-chemical removal principle in combination with a diamond wheel, the machine is said to have a grinding speed from two to four times as fast as with conventional metal bond diamond wheel grinding. (Hammond Machinery Builders, Inc.)

Circle 36 on postcard for more data

What's NEW at the NATIONAL METAL SHOW

CHICAGO
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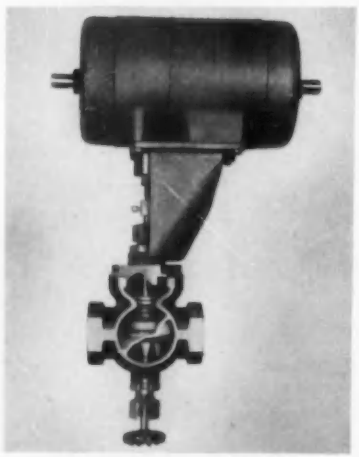
FOR ADDITIONAL INFORMATION
please use reply card on Page 97

Instrumentation

Shown for the first time in a display of latest instrumentation will be the new Electr-O-Line control unit designed to provide close control of temperature in metal processing furnaces and ovens. Also to be introduced are the new Electr-O-Volt current proportioning electric control units and the new Electr-O-Pulse time proportioning electric control unit. The exhibit will additionally show the new Brown magnetic amplifier used with the Electr-O-Volt unit to proportionally saturate the control winding of a saturable core reactor. With these control units will be models of ElectroniK instruments.

A further display unit is the new Actionator motor, an electric operator for such final control devices as valves, louvers or dampers which regulate fuel input into metal processing furnaces and ovens. *Minneapolis-Honeywell Regulator Co.*



Honeywell Actionator motor for operating valves, louvers or dampers

Circle 37 on postcard for more data

Ultrasonic Machining

Included in an operating exhibit will be new Sheffield-Cavitron ultrasonic machines, tools, and techniques for cutting, drilling and engraving hard and brittle materials. Among the equipment will be a portable bench-type model, equipped with a hand-type ultrasonic machining tool; a heavy-duty unit capable of machining a 3½-in. diam cut in one operation; and the Sonitrol power feed attachment for existing machines that provides automatic control over tool feed. Typical materials which will be ultrasonically machined will be ceramics, ferrite, glass, quartz, and sapphire.

This exhibit will also demonstrate a transfer unit for converting any standard straight side press into one capable of handling a number of die operations simultaneously. Called the Press Pacer, it transfers stampings from one die station to the next on each stroke of the ram, or from one press to the next. Mechanical in operation, the unit is driven by means of a lever arm attached to the ram. *The Sheffield Corp.*

Circle 38 on postcard for more data

Steel and End Products

A comprehensive exhibit will display stainless, tool and die, and electrical steels, as well as carbide, forging, casting, wire, rod and bar, sheet, strip and plate items. One of the products to be shown is a Diesel locomotive nozzle ring, a stainless casting with forged blades fixed into position by the cast-weld fabrication process.

Products made by the consumable electrode vacuum melting process will be included. Samples of the company's precipitation-hardening stainless steels—AM-350 and AM-355—used mainly in the aircraft industry for structural members, will likewise be shown. Honeycomb sections of this material will also be displayed.

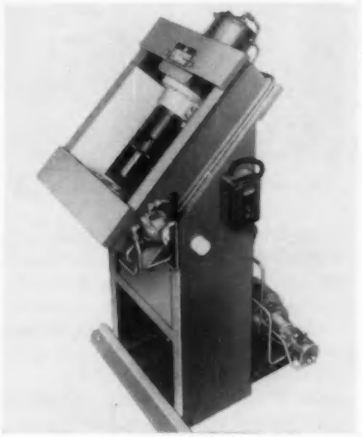
Extruded sections, some of unusually intricate design and made of stainless, tool steels and AISI grades, will be exhibited. The Carmet Div. of the company will display its new line of tool holders and indexable inserts. A selection of special brazed tools, and some examples of preformed carbide sections will also be shown. *Allegheny Ludlum Steel Corp.*

Circle 39 on postcard for more data

Industrial Furnaces

The theme of one unique exhibit will be the overseas activities of a company in the industrial furnace field. This will include a model of an atmosphere generator which was built in Japan for one of the leading motor companies. Also on display will be models of standard heating equipment, special heat treating equipment, automated lines, steel mill equipment, and other equipment for the processing of metals from the ingot to the finished product. *Surface Combustion Corp.*

Circle 40 on postcard for more data



Swaging Machine

On exhibit will be this new 45-deg angle swage machine which allows the operator to remain in a normal upright position while setting up and controlling the swaging operation. It also permits easier handling of large size, long length hose assemblies. (Weatherhead Co.)

Circle 41 on postcard for more data

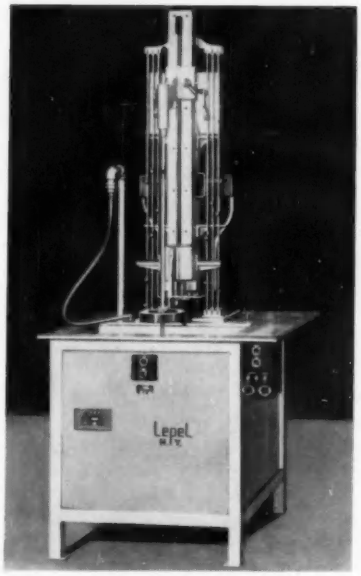
Hardening Machines

In one exhibit two machines will be in operation, hardening two automotive parts. One of these is the new 15-kw, watercooled Inductron induction heating machine. It will be equipped to automatically harden both ends of push rods. The other unit is a new Flamatic hardening machine whose features include "building block" construction. Cup and pad sections of rockerarms will be flame-hardened six at a time, using natural gas for fuel. Also on display will be the company's new power control cabinet for Flamatic hardening machines, and Flamatic spindle unit. *Process Machinery Div., The Cincinnati Milling Machine Co.*

Circle 42 on postcard for more data

Surface Hardening Unit

To be displayed in one exhibit will be a unit for selectively hardening the surfaces of shafts, rods, spindles, etc., by induction heating. Called the



Lepel Model 30 progressive feed unit selectively surface-hardens shafts

Lepel Model 30 progressive feed unit, it will handle lengths up to 30 in. The heating coil is traversed from the bottom toward the top on a rest which travels on ways and which feeds automatically along the work. Movable stops, positioned to trip microswitches along the ways, turn the converter and quench water off and on for the hardening of predetermined localized sections of the workpiece. *Lepel High Frequency Laboratories, Inc.*

Circle 43 on postcard for more data

Test Equipment

Featured in one exhibit will be a wide range of test equipment. It will include an air-operated creep and stress rupture testing machine of 24,000-lb capacity; the Air-O-Brinell Model No. 1 hardness testing machine; and the 60,000-lb Deluxe Model Super L type hydraulic universal testing machine complete with electronic recorder, extensometer, deflectometer and compressometer. The Rava electro-mechanical balancing machine will also be among the exhibited equipment. *Tinius Olsen Testing Machine Co.*

Circle 44 on postcard for more data

Treating Materials

New materials for phosphating, barrel finishing, rust and scale removal, and paint stripping will be featured in one booth. The new materials include a non-foaming alkaline detergent for removing identification inks from aluminum, a barrel burnishing compound said to produce superior color and luster, and a powdered acid scale and rust remover. Also included will be a solvent acid stripper that removes epoxy resins at room temperature, and a new zinc phosphating compound for low temperature applications. *Oakite Products, Inc.*

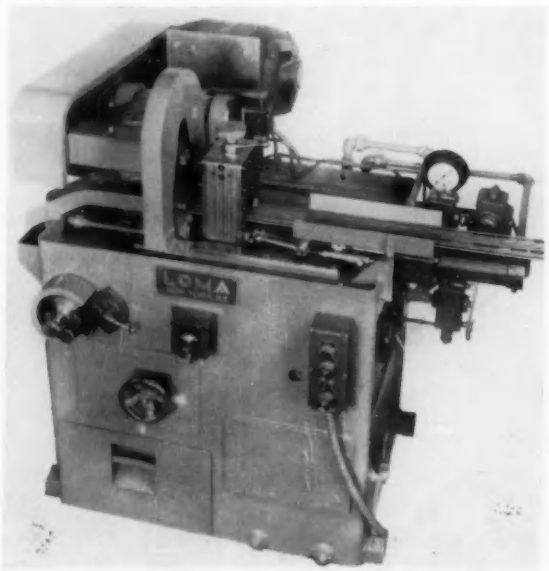
Circle 45 on postcard for more data

Tool Steels

Tools of high-speed steels will be featured in an exhibit which will highlight the theme, "modern high speed steels are tougher, stronger, chip-less and cost less per cubic inch of metal removed." The company's recently announced ultra high strength steel, VascoJet 1000, will also occupy a featured position in the display. Sections of the booth will be devoted to displays of special cold and hot drawn shapes, die blocks, tool bits, drill rod, precision ground tool steel, and pre-alloyed steel powders. *Vanadium-Alloys Steel Co.*

Circle 46 on postcard for more data

Fully-Automatic Air-Hydraulic Circular Saw



Among several metalworking machines to receive their initial public display will be this 12-in. diam fully-automatic air-hydraulic circular saw. It is designed for cutting simultaneously multiple strands of non-ferrous tubes and rods. Also to be shown will be a new 26-in. diam high-speed swinging arm circular saw, capable of cutting through an eight-inch diameter aluminum alloy billet in only four seconds. (Loma Machine Manufacturing Co., Inc.)

Circle 47 on postcard for more data

Brazing Machine

An operating display will include this automatic brazing machine as an example of the application of high-speed heating to silver brazing and similar joining operations. Components will be joined using a continuously rotating dial conveyor. The parts can be brought to temperature in 15 sec by four gas-fired burners, permitting a production rate of 1800 per hour. (Selas Corp. of America)

Circle 48 on postcard for more data

(*Turn to page 87, please*)

News of the MACHINERY INDUSTRIES

By Charles A. Weinert

New Method of Grinding Drills Results in More Accurate Holes. Special Machine Developed for Grinding Drills to the New Three-Dimensional Spiral Surface

The Spiral Point Drill, A New Development

Prior reference has been made to a new drill point development called the Spiral Point, with the promise of further details (AI, October 15, page 166). The development comprises a new type of drill point geometry — a "three-dimensional spiral point"—as well as a new method, and means, of point generation. Both were introduced and described at a recent technical activities seminar held at The Cincinnati Milling Machine Co.

Figures 1 and 2 show the configuration which was evolved from an extensive study to improve the cutting characteristics of twist drills. Principal objectives were to overcome the lack of centering and poor cutting action under the chisel edge of the conventional chisel point drill. As illustrated and as indicated by the name "spiral point," the entire flank surface associated with each cutting edge is formed as a "three-dimensional spiral" surface extending from the axis of the drill to its periphery.

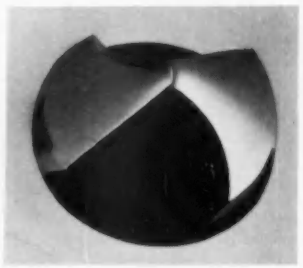


Fig. 2—Models of conventional chisel point and spiral point drills

Because of the way in which the spiroidal surfaces are ground, the drill is formed with a true point. The chisel edge is eliminated, and in its place is an S-shaped cutting edge. The two halves of the "S" are formed by two intersecting arcs, leaving a relatively sharp point coincident with the axis of the drill. Therefore the spiral point drill centers itself on the axis of the drill at the instant of engagement with the workpiece. And it is usually unnecessary to use center-punched holes or guide bushings to determine or maintain the proper location of a hole.

The advantages claimed for this drill over the standard chisel point drills include the following: As mentioned above, it has a self-centering effect. It is said to produce rounder, straighter holes, truer to size. Drill thrust force is reduced as much as 34 per cent (because of the effective cutting edges and chip space in the area close to the drill axis). When applied to sheet metal, it produces a round, practically burr-free hole. For the latter purpose, a modification of the point has been found to be desirable in order to prevent burr and grabbing on break-through. The modification consists of changing the point angle of the drill from 118 to 180 deg. Another stated advantage is that drill life in actual practice is extended materially. In one test

(*Turn to page* 95, *please*)

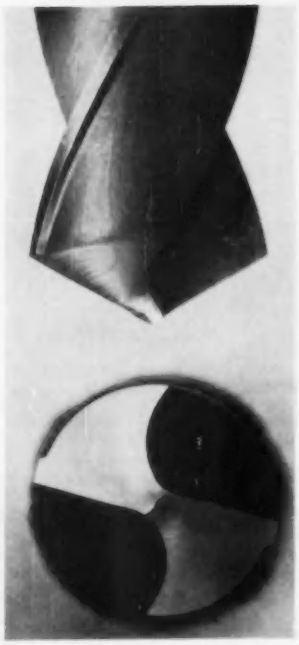


Fig. 1—The spiral point drill

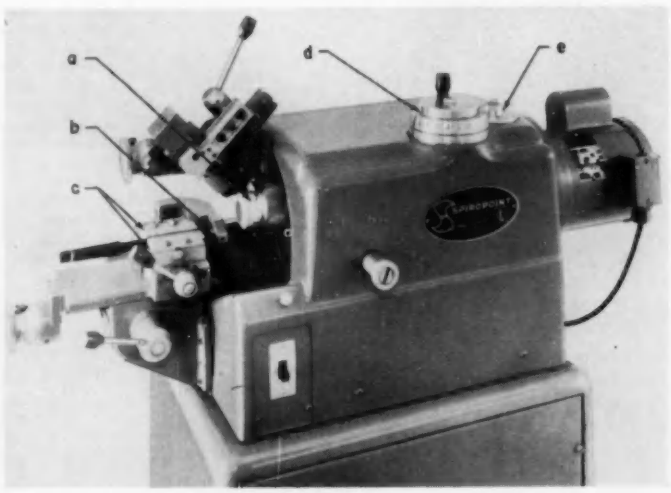


Fig. 3—Spiropoint drill sharpener. (Text gives details of keyed letters.)

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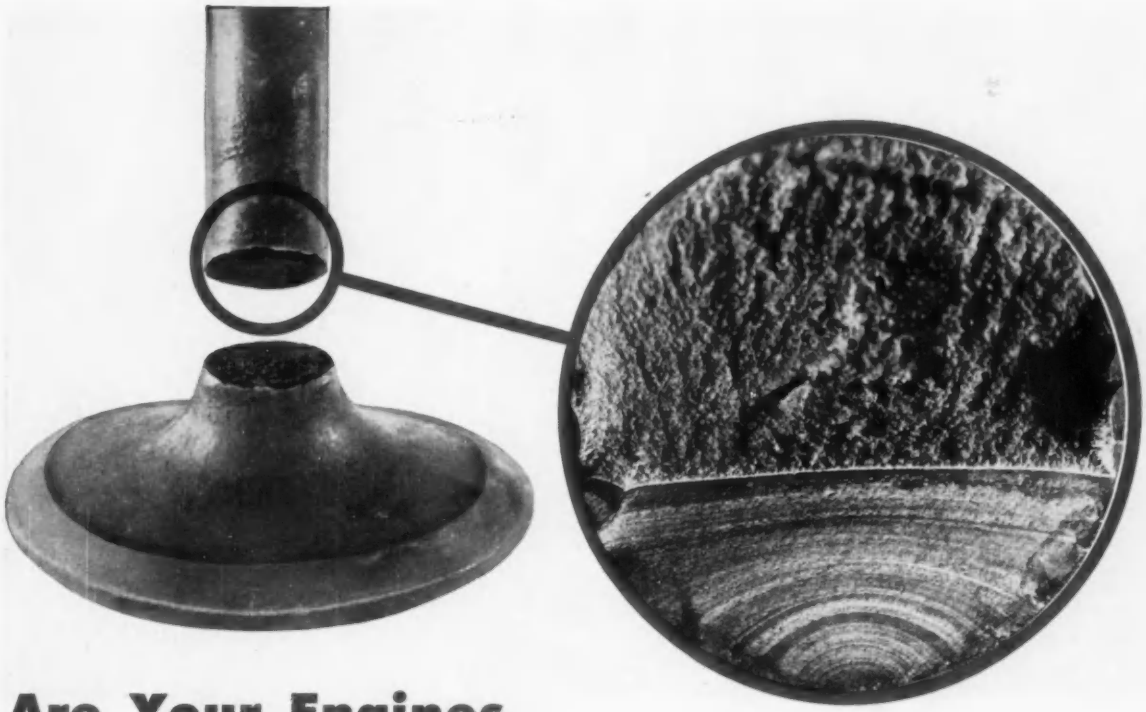

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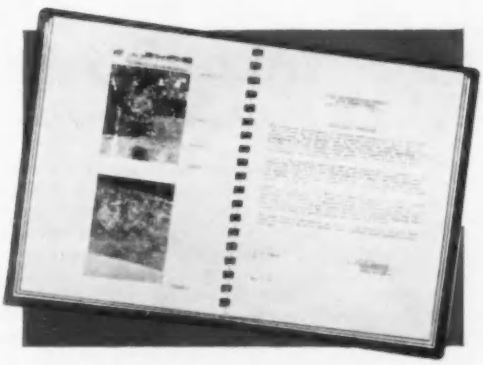

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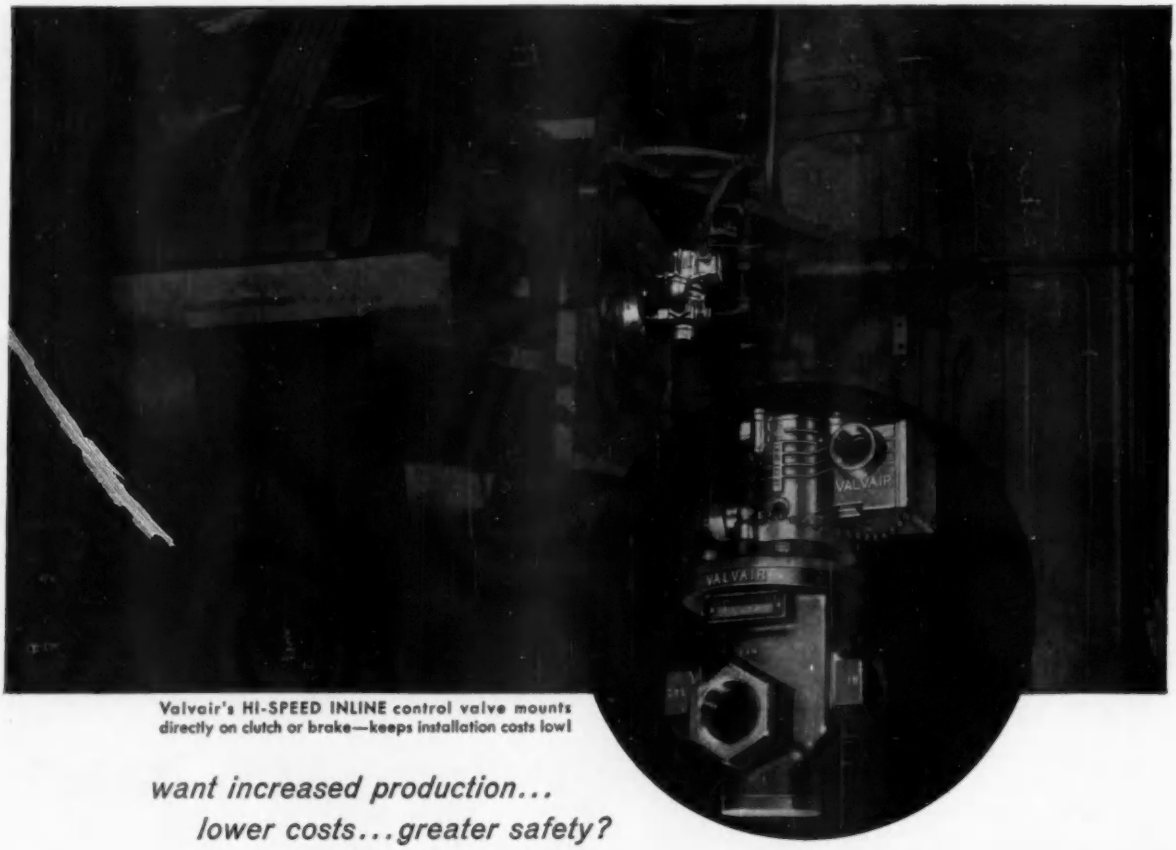

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Short travel, air cushioned poppet action is the HI-SPEED INLINE'S speed secret. Simple design assures multi-million cycle dependability . . . the valve has only 3 moving parts!

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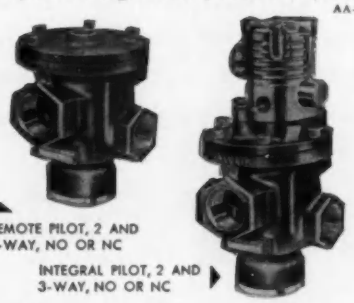

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What's NEW at the NATIONAL METAL SHOW

CHICAGO
NOV. 4-8

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(*Continued from page* 79)

Drilling Attachment

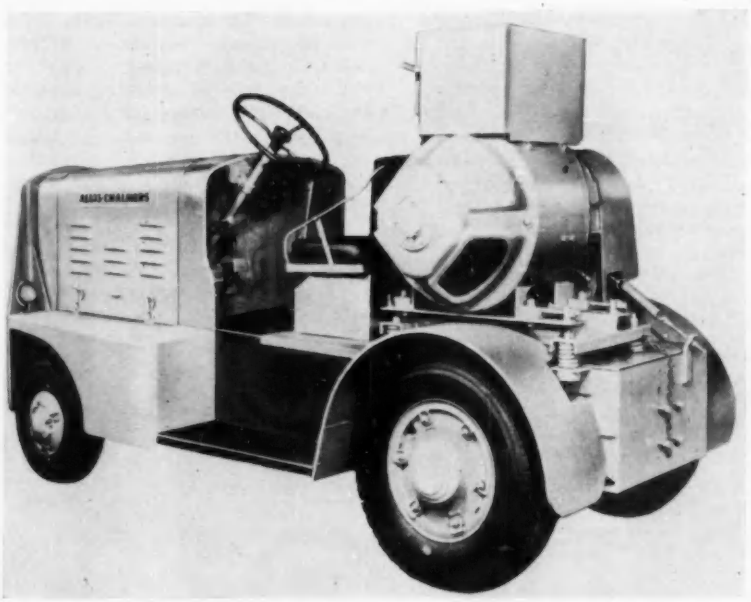
Show visitors will see for the first time a new Multi-Drill, identified as Model 400. It is a close-coupled multiple spindle drilling attachment for application where no more than four holes are to be drilled or tapped at one time and where the hole pattern is equally spaced. Available with two, three or four spindles, drill capacity of the new unit is ¼-in. in steel. A variety of special spindles and accessories to increase the versatility of the Model 400 is available and will be demonstrated in the booth. *Commander Mfg. Co.*

Circle 49 on postcard for more data

Forming Machinery

A large booth will display a number of metal forming machines and associated equipment. A new development in rolling mills will be first shown at the show. Also on exhibit will be the Model 4-½F swaging machine (long die) that will produce tapers up to 15-in. in length; and a new automatic feed hydraulic loader attachment for swaging machines. The display will additionally include a superfine wire drawing machine capable of drawing down to 0.0008-in. *Fenn Manufacturing Co.*

Circle 50 on postcard for more data



Allis-Chalmers TG-45 industrial towing tractor equipped with 300-amp welder

Industrial Towing Tractor and Lift Truck

Featured in one exhibit will be the new TG-45 industrial towing tractor, which will be shown equipped with a 300-amp welder. It is a 4500-lb drawbar pull capacity unit, with low silhouette and of compact design, capable of towing 90 to 100 tons on level surfaces.

Also to be exhibited will be the company's FT-40-24C, 4000-lb capacity lift truck. This unit is powered by an LP-gas engine and will be equipped with the recently-introduced power shift torque converter drive transmission. *Allis-Chalmers Manufacturing Co.*

Circle 51 on postcard for more data

Vacuum Furnace

One of the featured products in an exhibit will be a new 50 to 300-lb induction melting furnace. Known as the FIM-300, it has been designed with flexibility for a wide range of applications. This unit has an 8-ft. long, 5-ft diam chamber, a 2900-liter-per-sec diffusion-ejector pump, a 310-cfm mechanical pump, and a control center. It includes two observation windows, a bridge breaker, and sight tube. Two spare ball-and-socket joints are provided for use with standard accessories.

Four independently-controlled charging cups are provided. They are of the tipping type to allow regulation of the rate and amount of additions. Charges to the crucible are handled by a solenoid - controlled feeder. The crucible is tilted by air-motor power and is remotely-controlled from the observation window.

The control center includes a Pirani-type gage, controls for all pneumatic valves, a schematic diagram of the pumping lines, and space for the addition of accessory equipment such as a strip-chart recorder or other gages. *Consolidated Electrodynamics Corp.*

Circle 52 on postcard for more data

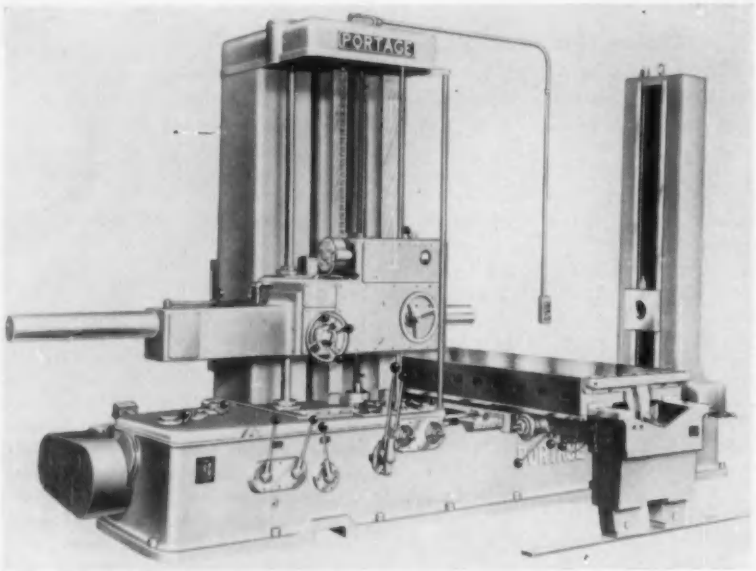
Paint Spray Gun

This improved Model 8 spray gun, incorporating the new Binks R-618 knurled pressure cup, will be part of one exhibitor's display. Also to be shown is the recently-introduced air-driven agitator siphon cup for use with acrylic lacquers. (Binks Manufacturing Co.)

Circle 53 on postcard for more data

NEW PRODUCTION and PLANT EQUIPMENT

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 97



Portage No. 5 three-way machine for horizontal boring, drilling, and milling

Horizontal Boring, Drilling and Milling Machine

A NEW machine for horizontal boring, drilling, and milling has been developed and is now on the market. The 36,000 lb, five in. diam. spindle device is available with vertical head travel of 48 in. and cross travel of table on the saddle of 60 in. Table working surface is 36 by 72 in. The total number of speeds available is 34 and speeds range from 7 to 1,000 rpm. Longitudinal travel of the saddle with tailstock mounted is 52 in. and maximum distance of the spindle sleeve to the tail block is 90 in. Optional ranges and sizes include 36, 60 and 72 in. vertical head travel and table working surfaces from 48 by 72 to 48 by 96 in. The longitudinal saddle travels up to 100 in. maximum and optional maximum distance of spindle sleeve to tail block is 138 in. A newly designed headstock has an independent motor driven oil-pump that insures a constant flow of oil to the bearings and gears. Included in the pump arrangement is a fan that forces a flow of air through the headstock over ventilating ribs to dissipate heat from the spindle sleeve bearing. Precision verniers, angular milling attachment, and angle plates represent a portion of the machine attachments and accessories available. *The Portage Machine Co.*

Circle 62 on postcard for more data

Excess Power Detector

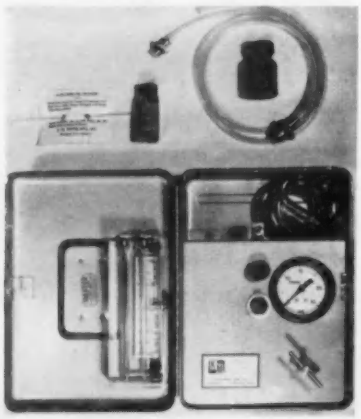
SENSITIVE control for high-speed, automatic feed machine tools can be obtained with a new current sensitive control designated Ex-Po-Det. The device follows the normal work load on the electric drive motor to which it is connected. While following changes in the normal load, it maintains sensitivity to momentary increases in the motor current. The J I C approved cabinet contains the necessary shock mounted components and is engineered for direct mounting on the machine tool. The machine operates on any voltage ac or dc drive motor up to 1100 volts and up to 20 amperes per phase. *Almy, Hayden & Maxwell, Inc.*

Current sensing device.

Circle 63 on postcard for more data

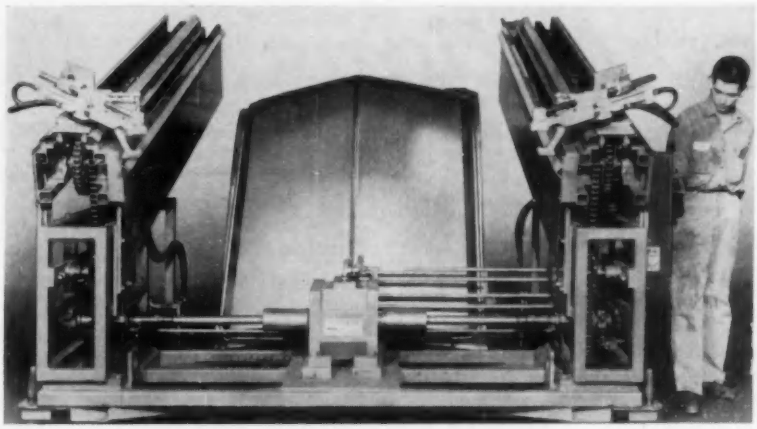
Fuel System Tester

ANNOUNCEMENT has been made of the new Robinair L. P. fuel system pressure regulator tester, Model 14-002. The fixture, designed to determine malfunction of the secondary regulator can also be used to check out the primary regulators. It consists of a 30 lb pressure gage, an aspirator and a 4 in. manometer housed in a self-contained metal carrying case. The unit operates under gas or air pressure. Applications include the determination of leaky check valves, faulty diaphragms and the adjustment of the amount of vacuum required to unseat the check valve. *Robinair Division, Kent-Moore Organization, Inc.*



Robinair fuel pressure gage.

Circle 64 on postcard for more data



PAS automatic dual-jaw unloader unit for handling extra large stampings.

Unloader Handles Extra Large Stampings

INTRODUCTION of a new standard dual-jaw automatic unloader for handling extra large stampings has been made. The portable, plug-in packaged automated unit has two standard mechanical jaw assemblies mounted on individual carriages. The carriages are advanced and retracted by a reversible air motor through a roller chain drive. The jaw assemblies are mounted on the carriages at a 45 degree angle so that they automatically clear the stamping when it is unloaded from the press. The jaw assemblies swivel in any plane for universal adjustment. The carriage slides have both vertical and angular adjustment, enabling parts to be unloaded on the binder angle.

The unloader operates on from 20 to 45 psi air line pressure depending on the carriage slide angle setting. A built in electrical control system enables the unit to be timed automatically to the press operating cycle. To unload a stamping with the unit, the jaws extend and grip the part when the press opens. Then the carriages retract. At the end of the carriage travel the jaws retract and release the part, dropping it into a standard turnover unit. The carriage advances to initial position for the unloading of the next part. *Press Automation Systems Inc.*

Circle 65 on postcard for more data

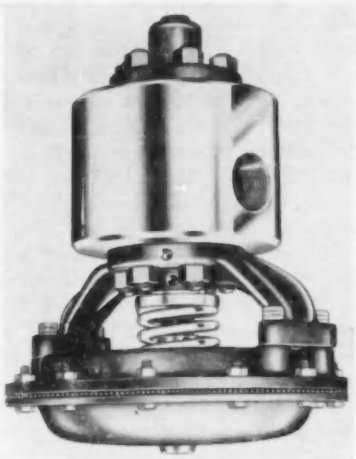
Handling Boom for Collapsible Containers

This handling boom for loading of bulk material collapsible containers has been introduced by Clark Equipment Co. The attachment fits all of the manufacturer's new Clarklift line of lift trucks from the model CY-200 (20,000 lb) to the C-350 (35,000 lb). It is designed to lift and carry collapsible containers up to the largest standard size. Its lifting height of 180 in. permits loading aboard gondola cars or highway trailers.

Circle 66 on postcard for more data

Control Valve

ANNOUNCEMENT has been made of a complete line of 6000 lb, 2 and 3-way control valves for use on plastic molding, ceramic forming and similar equipment requiring high operating pressures. These valves feature bodies machined from solid aluminum bronze bar stock. The sleeve type construction with a replaceable hardened stainless steel seat sleeve insert in the valve body is said to assure alignment of the valve stem and seats at all times. Stem seats are Stellite faced.



Sinclair-Collins control valve.

Available in ½ through 2 in. NPT sizes and suitable for control of high pressure fluids, these 6000 lb 2 and 3-way valves are designed for use with Sinclair-Collins cycle controllers, with any applicable pneumatic or electro-pneumatic cycle control device, or for manual operation. The valve diaphragm is actuated by 35 to 40 psi air. All valves are offered either normally open or normally closed, with balanced stems. *Sinclair-Collins Valve Co.*

Circle 67 on postcard for more data

High Speed Saw Blade

DEVELOPMENT of a saw blade for cutting stainless steel and to be used on portable high-speed reciprocating saws has been announced. The new blades can make limited cuts in materials up to a hardness of 55 Rockwell on the C-scale. Five sizes with teeth per in. specifications of 10, 18, 24, and 32, and usable cutting length of 1⅝ in. are listed. They are designed for use with the Keesling developed Handy Angle reciprocating saw. *H & T Kessling Corp.*

Circle 68 on postcard for more data

Observations

By Joseph Geschelin

Air Ride

Air ride for passenger cars has taken several directions this year. AMC, for example, will supply air bags with leveling only at the rear and only on the Rebel and Ambassador. General Motors cars mount coil springs in the rear on the same configuration required for air bags; while Ford Motor Co. divisions will supply the special mountings only when air ride is specified. Thus GM cars amortize the cost of air bag mountings over all production while Ford divisions tack on the extra cost only when air ride is wanted. Incidentally, judging by early estimates made by the various car divisions, air ride is expected to range from 15 to 20 per cent of sales in 1958.

Faster Cooling

One of the top priced cars intends to offer a dual air conditioning installation next year — with one unit in front, the other in the trunk, to provide quick cooling. The maker finds that the customer who can afford the best want cooling when they get into the car without waiting for the usual interval.

Spark Plugs

When you look under hood of most 1958 cars, particularly when all power assists, air conditioning, and air ride are installed, accessibility for even minor repairs or adjustments is just not there. For one thing, it will be quite difficult on some cars to get at spark plugs. One chief engineer who has given this situation some thought tells us of experimental work afoot to increase the useful life of spark plugs, perhaps as high as 25,000 miles. Moreover, engineers still are looking to the day when alternator systems suitable for passenger cars, and suitably priced, will be made available. The higher voltage of such systems will make it possible to extend spark plug life materially by bridging the gap even when erosion or deposits are present.

Spring Suspension

With the general adoption of coil springs all around on General Motors Corp. cars, 1958 ushers in a year in which over 50 per cent of the leaf springs consumed for passenger cars up to now will be eliminated in favor of coil springs.

METAL SHOW TO BE LARGEST YET

(*Continued from page* 74)

esses." This will be held at the Palmer House. The subjects of the six papers to be presented are: Modernization in heating for hot forming; Metallurgy of annealing in fractional-minutes; Techniques and metallurgy of induction vacuum melting; Convection and radiation in high-speed heating; Influence of high-speed strip annealing on metallurgical properties; and Automation in heating and quenching.

Metals Division, Special Libraries Assn.

The Metals Division, Special Libraries Association will report progress in ferrous and non-ferrous metallurgy, and cover the international aspects of literature research in a series of conferences beginning November 6. Headquarters of the SLA will be at the Knickerbocker Hotel; while the meeting places will be Armour Research Foundation and International Harvester Co. Central School.

Powder Metal Association

There will be a joint session of the Metal Powder Association and ASM on November 7 at the Palmer House. One of the three papers to be presented at this session is entitled "Current Advances in the Science of Powder Metallurgy," by J. E. Burke and H. H. Hirsch, General Electric Research Laboratory. Another paper will deal with "Metal Powders to Solid Strip," co-authored by W. N. Hayden, Hayden Metals, Inc., and J. D. Shaw and W. V. Knopp, S-K-C Research Associates.

Society for Nondestructive Testing

The 2nd International Conference on Nondestructive Testing, sponsored by the Society for Nondestructive Testing, will meet at the Hotel Morrison on November 4 through 8. It will be a participation conference having as its principal subjects: the Basis for optimum test methods selection; Recommendations for technical development and standardization; Nondestructive testing of nuclear power reactor components; and Nondestructive testing techniques. In the latter session, eddy current testing will be discussed by G. O. McClurg, Magnaflux Corp., and J. Allen, Union Carbide Nuclear Co. Ultrasonic testing will be the subjects of papers presented by J. C. Smack, Curtiss-Wright Corp., and P. K. Bloch, Branson Instrument Co.

Mercury Adds Park Lane to Series

(*Continued from page* 55)

all models. Here the front air bags replace the coil springs in the front suspension. At the rear the air bags are mounted on the special trailing arms (used only with air suspension). In addition, the rear axle is held in position laterally by means of a track bar. Front shock absorbers are one-inch size on the standard and air cushion suspension. However, they have more travel and are mounted outboard, only with air cushion. Rear shock absorbers are of 1⅝ in. size, standard equipment.

A single-cylinder, reciprocating type air compressor, mounted at the front end of the engine and belt-driven, provides air at 300 psi for the system. It is used in conjunction with a cylindrical air reservoir of 400-cu in. capacity, mounted within the front end of the front fender.

Three special leveling valves are provided for this system, one for each front air spring, and only one at the rear. This arrangement is said to afford better roll control. A pressure regulator at the air reservoir modulates air line pressure to 160 psi for the air springs.

Special solenoid control, actuated when any door is open, provides for fast leveling. Under all other conditions leveling action is at a slower rate so as to be unaffected by momentary changes due to bumps or holes or braking or due to the action of dynamic forces when cornering. In addition, a special T-check valve is installed at each air spring to control low pressure limit when jacking the car is necessary.

Important improvements have been effected in the standard suspension system as well. First of all, heavier spindles and bearings are provided on Park Lane models. The front suspension upper arm has a new threaded bushing, lubricated for life with a lithium-base lube. The lower arm is mounted in a large, cushioned rubber spool type bushing.

Important improvements have been made in the brake system. For one thing, lining area has been upped to 233.5 sq in. with 11 x 3 in. fronts, and 11 x 2.5 in. rear drums, on all models. The major change is in the adoption of an automatic brake lining adjustment mechanism in which the lining-to-drum clearance is maintained constantly and automatically to a limit of 0.009-0.012 in. This adjustment is made independently at each wheel during reverse braking when, presumably, the brakes are at their lowest temperature. This provides for full pedal reserve at all times, assures uniform braking and improves lining life.

Perhaps the biggest story on the Mercury line is in the offerings of entirely new engines. As mentioned earlier, there are two basic engines: 383 cu in. and 430 cu in. displacement. These engines combined with special carburetor options provide a range of four special powerplants.

The economy version of the 383 cu in. engine has a special four-barrel carburetor in which only two barrels are in normal operation, the two secondary barrels being arranged to come in only at speeds above 70 mph. This engine, with single exhaust, is standard on Monterey cars and Commuter station wagons.

The same engine with a conventional type four-barrel carburetor and single exhaust system is standard on Montclair cars and on Voyager and Colony Park station wagons.

The 430-cu in. engine, with four-barrel carburetor, fitted with the Schwitzer power-booster fan drive, and dual exhaust system is standard on the Park Lane models, optional on the Turnpike Cruiser. This engine is supplied only in combination with the multi-drive transmission.

Schwitzer power booster fan drive is available as optional equipment on all engines in the line. It is standard when air conditioning is specified.

The 430-cu in. engine, equipped with the combination of three, two-barrel carburetors and dual exhaust, is offered as optional equipment on all models. It is available only in combination with the multi-drive transmission.

Bendix linkage type power steering, standard on Park Lane and optional on all other cars, provides an unusual feature. The power steering pump is of special design adapted for mounting directly off the end of the crankshaft.

Apart from significant details of engine component design, one of the major features of this family of engines is found in a rather unique concept of combustion chamber arrangement. The face of the cylinder head is machined flat and without the usual cavities. This permits the placement of valves and spark plugs in the most favorable position without restricting valve size in any way. Similarly, the cylinder bank faces are machined flat, special feature being that bank faces are machined at an angle of 10 deg with respect to the piston axis. When the heads are installed, this angularity defines combustion chamber configuration.

The piston dome is of stepped type. At the top of the compression stroke, therefore, the piston dome defines the combustion chamber cavity precisely, the stepped portion serving to provide the necessary quench area.

The cooling system is arranged for three-stage operation, controlled by three sets of thermostats. The first stage has water circulating only within the heads and intake manifold jacket. The second stage permits circulation within the heads, intake manifold jacket, and cylinder block. The third stage permits full circulation including the radiator core.

Connecting rods are shorter, have a wider cross-section at the big end, making for less weight and greater strength. Piston pins now are held with a press fit, eliminating the small end bushing.

Major changes have been effected in the valve train. Hydraulic valve lifters have larger check valves and larger orifices. Intake and exhaust valves have aluminized heads while stem thickness is increased for added strength. Pushrods are of solid steel with a spherical radius at each end. Valve springs are of heavier gage wire.

New Lincoln and Continental Models

(Continued from page 59)

allows closer tolerances and better control of compression ratio. The wedge shape of the chamber, combined with new step-top pistons, increases the turbulence of the air-fuel mixture.

An improved lubrication system features a positive displacement, rotor-type pump located at the front of the engine inside the oil pan. The oil pan, provides a deep oil reserve for the pick-up screen.

The engine cooling system includes a water-jacketed intake manifold. The new cooling system, with three thermostats, allows for improved engine warm-up and faster heater warm-up.

A new trailing-arm rear suspension with coil springs, eliminates rear-end squat on acceleration and rear-end rise on braking. Coil springs control movement between the axle and the body, and the driving force is taken through the trailing arms, eliminating the "windup" present in the conventional leaf-spring rear suspension which Lincoln used in 1957.

The front suspension is the improved independent ball-joint type with coil springs and double-acting hydraulic shock absorbers.

Redesigned for the new Lincoln engine's increased torque output, the larger transmission features a stronger welded steel converter assembly with an increased diameter. The Turbo-Drive transmission gives the driver faster and smoother response, especially in the low-range downshift from second to first gear.

Another feature of the transmission is that the engine can be started in 1958 with the selector in "park" as well as "neutral" position.

The 1958 Lincoln and Continental have a front-located air conditioning system with provision for direct cooling and heating of the rear seat area through front door ducts. The new system, operated by a single knob on the instrument panel, provides flexibility of heating and cooling, more draft-free air conditioning and improved air distribution.

Flow of warm air is directed through four registers—two on the cowl trim panel for front seat heating and one in each front door duct for heating the rear passenger compartment. Cool air also can be directed through these four registers and in three additional registers in the instrument panel. The new air conditioning system eliminates the two plastic ducts at the rear window.

A selector dial, controlled by a single knob, allows the driver to adjust the heating-air conditioning-ventilation system quickly and automatically. Passengers may direct the cool air reaching the rear compartment by operating adjustable air conditioning registers located on door panel ducts. The driver may also change the direction of the air in the front compartment by adjusting the registers located in the instrument panel.

The air conditioning and heating system also includes two knobs on the instrument panel for seasonal control in converting from summer cooling to winter heating.

New De Soto for '58

(Continued from page 53)

ard with the Fireflite, delivering 305 hp. The Adventurer's power plant will be announced at a later date.

Three-speed Torqueflite and two-speed Powerflite "push-button" transmission are again available.

Electric window lifts, factory undercoating, tinted glass, rear window defroster, six-way power seats, dual power-operated radio antennas, rear shelf radio speaker, a transistorized radio, power brakes, and padded instrument panels are available extra, as are aircraft type seat belts.

For the third year, De Soto will also offer a convertible and a two-door hardtop Adventurer sports car, which will be available with fuel injection. Complete specifications of the Adventurer will be announced later.

The new "Constant Control" power steering, Sure Grip differential, and fuel injection system were described in AUTOMOTIVE INDUSTRIES, October 15, page 52.

This country's loss of first place in the missile race is due in part to our failure to permit free play of scientific thought — within a sensible security and administrative system—top scientific leaders are saying. In effect they are repeating earlier warnings.

Some kind of Government encouragement to science and engineering students is now a likely prospect. Washington concern over recent Communist advances has raised serious questions as to the adequacy of present U. S. education of scientists, engineers, and electronics specialists.

Demands for a single missile command, comparable to the Manhattan (atomic bomb) project of World War II are increasing. It may well presage an eventual reorganization of our missile efforts with all our resources placed in a single program.

Some military spokesmen say they expect this country to be first to develop a satellite that can return undamaged to the earth. And earlier talk indicated that this summer's atomic test series may pave way for relatively quick development of a nuclear-powered rocket.

Russian scientists will probably follow up their satellite coup quickly with announcements of an atomic railway locomotive and effectively harnessing solar energy to general electricity. This announcement, U. S. observers believe, will come about Nov. 7, when the Reds celebrate the Bolshevik revolution. Soviet political leaders are believed to be putting the full publicity limelight on scientific achievements to offset dissatisfaction in the Communist countries over the shortage of consumer goods.

Atomic Instrumentation, Delco-Remy Battery Plant

(*Continued from page* 69)

active isotope developed by the Atomic Energy Commission at Oak Ridge.

A beta ray gage already used extensively by steel mills and cigarette manufacturers proved adaptable to the separator process and was installed in the Muncie plant early in October. Chart III shows a sampling from production five days after the unit was put in service.

The dramatic improvement in uniformity is obvious with all samples now falling well within the specification limit. The process has been stabilized to where the operator can work very close to the specification median, resulting in considerable material savings. The greater uniformity in thickness resulted in lowering separator resistance an average 10 per cent. This lower electrical resistance in the separator produced a battery with significantly higher terminal voltage and increased ability to crank the car engine.

Delco officials say that an automatic control device based on the feedback principle can be installed if needed. Such a control would relieve the operator of still more responsibility.

The heart of the new measuring instrument is a hermetically sealed capsule containing radioactive strontium 90. This isotope particle, about the size of a grain of salt, provides a constant source of energy in the form of high speed electrons of the beta ray type.

The detector unit is a kind of specialized Geiger counter. It is located about two inches above the source capsule and is filled with an inert gas. As the counter is bombarded by electrons, some of the gas is ionized. The ionizing gas sets up tiny electrical voltages which when translated and presented in visual form show up on the recorder as variations in thickness of the material.

The equipment in use at the Delco Battery plants have scanning units which resemble heavy elongated C-clamps riding on a pneumatically-actuated pedestal mounted transversing systems. The radiation source is mounted on the bottom jaw of the clamp, and the detector opposite it on the upper jaw. The unit is located adjacent to the calendering mill and arranged so that the separator sheeting coming off the calender rolls passes between the isotope and the detector. Thickness readings are taken alternately from positions near each edge of the sheet.

Indexing is controlled by a programming mechanism which can be preset by the operator. In normal use readings are taken for two minutes near one edge, then the scanning unit automatically transverses to a position near the opposite edge.

The gage has the uncanny faculty of checking on its own accuracy. Once every 30 minutes it moves off the job and spends 45 seconds in recompensating itself for changes in humidity, temperature, accumulations of dirt, and for any other environmental factor which might conceivably affect its accuracy. Should the machine be unable to zero itself, it shuts off, rings a bell, and turns on a series of lights showing the operator where to look for the trouble.

From a manufacturing standpoint Delco officials have found the isotope micrometer to be a reliable production tool. Down time on the instrument has averaged less than one hour per month since it was installed last fall. It has made possible the production of more separators per pound of material, eliminated rejects and greatly improved quality. It has taken the guesswork out of rubber calendering leaving the operator free to keep a closer watch on other parts of the process.

As a process control tool it is excellent. The direct reading recording unit makes it possible to detect any change or mal-functioning of the complicated rubber making process almost instantaneously, and the permanent record makes a valuable process research tool.

Finally, it has proved an invaluable aid in making thinner microporous rubber separators of great uniformity. These thinner separators, in addition to making possible large savings in material, have enabled the Delco engineers to build a battery with improved life and greater cranking ability.

OLDSMOBILE

(*Continued from page* 57)

leaf springs and are mounted in a crossmember at the corners of the frame over the axle. Axle positioning is controlled by means of four radius arms mounted in rubber. Two of these are installed parallel and two diagonally between the axle and frame to control both fore and aft and lateral movements.

The air ride system is distinctive in featuring a closed circuit air system which does not exhaust to the atmosphere. To accomplish this, Oldsmobile employs two air reservoirs—a high pressure reservoir mounted within the rear fender on the right hand side, and a low pressure tank mounted within the left rear fender. The high pressure tank takes air from the compressor and serves the air cushions; the low pressure tank stores the air flow exhausted from the cushions and returns it to the air compressor on demand. The air compressor for this system is of two-cylinder piston design, driven by double V-belts.

Being a closed system, it requires a complex of valving as noted on the layout. The arrangement of height control valves is such that two valves are used at the rear, only one at the front.

A number of interesting items of special equipment are offered this year. One of these is a maximum speed warning signal which comprises both a warning light and a buzzer. In addition, there is a radically new type of optional radio. The unit is of transistor construction and is composed of an independent package which is simply plugged into the radio compartment. It can be removed readily for use as a portable radio set. The Autronic eye has been improved by the addition of a sensitivity control, making it less susceptible to stray light.

An improved air conditioning system now is optional.

Canada's Automobile Industry

(*Continued from page* 71)

roof. In addition, General Motors has an engine plant at Windsor, covering nine acres under roof, and another at St. Catherines, Ontario. At the Oshawa plant cars are produced at the capacity rate of one every 54 seconds, with record production being 1393 in a single day. All but the highest priced models are made here; these and Cadillacs are imported from the United States.

The General Motors plant at Oshawa is the largest automobile plant in Canada. Its versatility can be ascertained from the fact that it this year produced 89 different passenger car models in 225 color combinations, using 37 different engines, 8 transmissions and with 56 options available. In addition, 160 truck models are produced here, ranging from 4000 to 42,000 lb gross vehicle weight. The Oshawa plant is the only one in the General Motors organization where Chevrolet, Pontiac, Buick and Oldsmobile are assembled simultaneously.

No plans for further expansion of the General Motors Oshawa plant have been announced as yet.

At Chatham, Ont., International Harvester manufactures its Canadian trucks and will soon have expanded space when its part depot there is transferred to a new $6 million parts depot now under construction at Hamilton. This new parts depot will handle both truck and farm equipment parts. Another parts depot for both truck and farm equipment is being built at Winnipeg. The enlarged space at Chatham will be used to expand truck production.

General Motors of Canada has 10 parts and accessories warehouses spread across Canada, Ford of Canada has eight such plants, Chrysler of Canada has five depots across Canada, and Studebaker-Packard operates two depots. Other automotive companies with parts depots and distribution centers include White Motor Co. of Canada, with a service center at Toronto; Volkswagen Canada Ltd. has a new $4 million spare parts plant at Toronto; and Austin Motor Co. (Canada) has a major depot at Hamilton.

Practically everything for cars and trucks is now made in Canada. Major imports for their assembly are sheet metal body parts which come from parent companies in the United States where heavy presses can more economically do this job. Parts of all kinds are made and shipped from all over Canada to the assembly plants at Windsor, Hamilton, Oakville, Toronto and Oshawa.

General Motors of Canada relies on more than 4000 Canadian firms to supply it with materials, which last year totaled over $350 million in value. Ford of Canada was supplied with parts by over 2500 Canadian firms and the bill totaled over $136 million last year. The products purchased by the automotive manufacturers range from raw iron from Canadian mines to radios, from aluminum to oil filters, and from wood products to headlamps. Manufactured parts alone which were supplied to Canadian automobile makers in 1955 were estimated by the Canadian Government's Dominion Bureau of Statistics to be valued at almost $525 million.

Canadian automobile manufacturers last year employed about 40,250 people and paid out almost $171 million in salaries and wages, according to the Canadian Automobile Chamber of Commerce. This was the highest employment on record in the industry. General Motors of Canada employs over 14,000 people in its various plants and warehouses, with 12,000 of that number in Oshawa alone. Ford of Canada last year employed close to 15,000 people at its various plants and had a wage and salary bill of $63 million. Chrysler of Canada had some 12,000 people working at its Windsor plant last year.

When American automobile manufacturers established their Canadian subsidiaries, it was primarily to sell cars in Canada and throughout the British Commonwealth. Prior to World War II exports were a major item in the production of Canadian plants, but in recent years have not kept pace with increased domestic production because of the currency restrictions and dollar shortages throughout the British Commonwealth. Exports last year accounted for only 33,480 cars and trucks, about 7.5 per cent of total production. About 25,000 passenger cars were exported and 8480 trucks and buses.

It is interesting to note that Ford of Canada operates subsidiary companies in South Africa, Malaya, Australia and New Zealand. In July, this year, the Canadian Ford plant exported its millionth car since it began its first exports in 1905. Ford accounts for 55 per cent of all Canadian automotive exports. Last year's exports were the second highest in the company's history.

In addition to the various passenger cars and trucks made in Canada, some trolley buses and gasoline-operated buses are made in Canada by Canadian Car and Foundry Ltd., at its plant at Fort William, Ontario. Most of the buses ordered in recent years by public transportation organizations in Canada have come from this plant. There are some imports of General Motors buses and from other United States manufacturers.

Automobiles imported from Europe have made a considerable dent into the Canadian automotive scene. Included are cars made by the British plants of Ford, General Motors and American Motors, as well as cars and trucks made by purely British, German, French and Italian manufacturers. Peak imports of European cars occurred in 1950 when over 67,000 passenger cars and trucks were imported. The number has been dropping since then, but the past year has seen an increase with over 38,000 passenger cars and trucks being imported, accounting for about 8 per cent of Canadian production.

Just under half the new cars and trucks produced last year in Canadian factories were sold on the instalment financing basis. The Dominion Bureau of Statistics reports that last year 224,905 new cars and trucks were financed with an amount of $521 million.

New Dodge Engines Featured

(*Continued from page* 62)

Coronet models. Torsion-Aire ride with torsion bars in front and outboard-mounted leaf springs at the rear is continued.

Offered this year for the first time as a single safety package on the 1958 Dodge are full-time power steering, Total Contact floating shoe power brakes, padded dashboard and padded sun visors. Other safety features include Life-Guard safety door latches and safety door handles, both designed to secure doors against accidental opening. The independent emergency brake adds the safety of two completely separate braking systems.

The three-speed manual-shift transmission is standard on Coronet and Royal models and may be specified on station wagons on special order only. PowerFlite is available as an option on Coronet; obtainable on Royal models only on special order. TorqueFlite is optional equipment across the board, except on six-cylinder Coronet models. It is a mandatory extra cost item on Custom Royal and station wagons, and on cars with the D-500 power packages.

The new "Constant Control" power steering, Sure-Grip differential, and fuel injection system were described in AUTOMOTIVE INDUSTRIES, October 15, page 52.

Dodge Trucks with Increased Ratings

(*Continued from page* 63)

sq in. on some models, are found on all 400 through 900 models. Air brakes, available on all 600 through 900 models, have across-the-board lining area increases up to 149 sq in.

Perhaps one of the most significant developments is the adoption of Torqmatic, an adaption of the well-known Allison six-speed transmission. The fully automatic transmission, with built-in hill retarder, will be available on models D500, D600, D700, S500, S600, and S700 with V-8 engines.

The extra-heavy duty five-speed synchro shift transmission which is standard on 900 models, is made available on 800 models as well. A new four-speed auxiliary transmission is available for 900 models. It has two underdrive ratios, a direct drive, and one overdrive ratio.

The LoadFlite, push-button controlled automatic transmission, is available for all conventional low-tonnage models; all Forward Control models; and W100, W200, W300 Power-Wagons with V-8 engines. It is standard on the Mini-van.

A 14,000-lb front axle package is available as a special equipment item for T900 models. It includes a heavy duty power steering gear, channel type frame reinforcements at the front, and high capacity 6500-lb front springs. The package is recommended for such vehicles as transit cement mixers, and long-body dump trucks.

A "full-traction" differential is offered as extra equipment for rear axles of all D100 models and for front and rear axles of the W100.

The W300 marks an addition to the Power-Wagon line this year with a maximum GVW rating of 10,000 lb. Featuring conventional styling, it offers a choice of either V-8 or 6-cylinder engine.

Forward Control models are available with a factory-installed body front end section, complete with windshield.

Additional mechanical features are as follows: Battery now located under the hood on all models except C-O-E's and Forward Control. Double-wrapped spring eyes now are employed on all medium- and high - tonnage models. Polarized wiring connectors at all junctions reduce corrosion and breakage, and facilitate servicing.

News of the MACHINERY INDUSTRIES

(*Continued from page* 80)

application, drill life with spiral point drills has averaged about six times that previously obtained with chisel point drills.

In order to make the spiral point, a machine was developed which is called the Spiropoint drill sharpener (Fig. 3). It will be marketed by the Cincinnati Lathe and Tool Co., a subsidiary of The Cincinnati Milling Machine Co. This machine is so designed that the drill is held stationary, while the generating system gyrates around it.

The small tubular grinding wheel (a) is mounted in a rotatable carrier so arranged that the desired shape is generated on the end of the drill as the grinding wheel gyrates around the drill axis. An adjustable truing device is provided for the grinding wheel so that the point angle of the drill may be varied from about 90 to 180 deg.

In operation, the drill is oriented against a retractable control bushing (b) and clamped in the jaws (c). It is then advanced so as to engage the continuously gyrating grinding wheel until the desired amount of stock has been removed. The entire sharpening operation is very rapid. A simple dial-indicated adjustment (d) provides the correct combination of radial and axial motions for any desired size of drill. Adjustment for values of relief above or below the standard amount (to meet special requirements) may be provided by rotating the second adjustable dial (e).

In summary, it is said that shop trials and laboratory tests conducted with the spiral point drill have produced results which indicate that it constitutes a significant contribution to drilling practice from the standpoint of improved quality and accuracy of holes. By the use of the Spiropoint grinder the spiral point can be generated on any type or make of drill at a cost no higher than that for producing the conventional chisel point.

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FREE LITERATURE

Etched Parts 1

Photo-forming of metal parts for a great variety of industrial and commercial products is illustrated and described in Bulletin 90 published by the *Superior Tube Co.*

Flexible Shafts 2

Basic information and data on a line of flexible shafts for a wide range of remote control, power drive and coupling applications is given in 14-page Bulletin 5601. *S. S. White Industrial Div.*

Stainless Steels 3

A new four-page bulletin (P. O. 2557) describes briefly the properties of 17-4 PH and 17-7 PH stainless steels. Typical applications are listed. *Armco Steel Corp.*

Flat-Die Forging 4

Facilities and equipment available for the production of flat-die forged products of high speed, tool, alloy and stainless steel are shown in a new folder available from *Smith-Armstrong Forge, Inc.*

Portable Power Pack 5

Operation of portable power units that provide fluid ground power to actuate and replenish hydraulic systems when aircraft engines are at a standstill, is described in Bulletin HP-200. *Greer Hydraulic, Inc.*

Screw Machine Products 6

Pertinent information about screw machine products is contained in a new 12-page brochure. Suggestions and ideas for getting precision and uniform accuracy are included. *J. J. Tourek Mfg. Co.*

Skew Loader 7

An automatic positioning unit that aligns center-bored parts for easy manual pickup on skews for heat treating is revealed in two-page Bulletin 570. *Gear-O-Mation Division, Michigan Tool Co.*

Airless Cleaning 8

Various applications of the new method of airless abrasive blast cleaning are described and illustrated in the Wheelabrator Digest (Vol. 17, 4), 16 pages. *Wheelabrator Corp.*

Broach Designs 9

Facilities for the design and production of broaches, holders and fixtures are described in a new four-page folder. *Apex Broach Co., Inc.*

Self-Locking Screws 10

Self-locking and self-sealing hexagon head cap screws, along with their applications, specifications and recommended usages are shown in a four-page bulletin. *The Cleveland Cap Screw Co.*

(Please turn page)

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Cut-Off Machines 11

New four-page color folder describes a line of cutting-off machines, automatic loaders, hot spinning machines and the Modern safety drill table. *Modern Machine Tool Co.*

Surface Grinder 12

Information is available describing the new Hydrabrasive surface grinders. Features, capacities, weights and specifications of models 824, 1218 and 1224 are included in the six-page catalog. *Abrasive Machine Tool Co.*

Steam Heat Treating 13

Catalog TD2-620(1), 20 pages, describes the effect of steam atmosphere heat treating on various materials such as high-speed tool steel, cast iron, powdered iron and structural steel. *Leeds & Nõrthrup Co.*

Air Motor Units 14

More than 30 basic air motor units and torque limiting components for multi-spindle screwdrivers and nutrunners are discussed in Bulletin 580-1, 36 pages. *Chicago Pneumatic Tool Co.*

Aircraft Cables 15

Tables indicating the diameter, minimum breaking strength and weight of aircraft cables and assemblies in tinned, galvanized and stainless steel constructions are contained in a recently revised edition to the brochure published by the *Aircraft Div., Bergen Wire Rope Co.*

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Milling Machines 16

Fully illustrated Bulletin 119, a wall-chart type broadside, provides a detailed analysis of the 2-H plain and universal milling machines. Capacity and operational characteristics, plus a comprehensive feed-speed chart and a floor plan are included. *The Greaves Machine Tool Co.*

Maintenance Chart 17

Preventive maintenance for a line of ram type and saddle type turret lathes is portrayed in a wall chart of recent publication. The chart is divided into three parts: cleanliness, lubrication, and inspection and adjustment. *Gisholt Machine Co.*

Fastener Catalog 18

Price, stock, and delivery information on a line of stainless steel and nylon fastenings is contained in a new 138-page catalog. *Anti-Corrosive Metal Products Co.*

Blind Bolts and Nuts 19

Eight-page brochure available from the *Hi-Shear Rivet Tool Co.* discuses in detail the structural and repair applications, design characteristics, and related subjects of blind bolts and nuts.

Modular Actuators 20

A line of modular actuators consisting of 64 standard, interchangeable actuator components are illustrated and described in four-page catalog 57A just published by *Airborne Accessories Corp.*

Die Set Catalog 21

Catalog 70-A, 16 pages, gives ordering data, dimensional charts and related information for Dieco all-steel die sets, cast die sets and special die sets plus extras. It also gives data on J.I.C. press room standards for bolster plates. *Ed W. Bliss Co.*

Mechanical Tubing 22

Bulletin TB-419, eight pages, supplies detailed information on the mechanical properties of electric resistance welded mechanical tubing. It also lists the various size tolerances to which the tubing is normally produced. *The Babcock & Wilcox Co.*

Power Supplies 23

Bulletin GEA-6690, six pages, describes d-c power supply systems designed for computer, aircraft, military and special applications. A chart citing relative characteristics of various power supplies includes electrical and mechanical details of d-c power units. *General Electric Co.*

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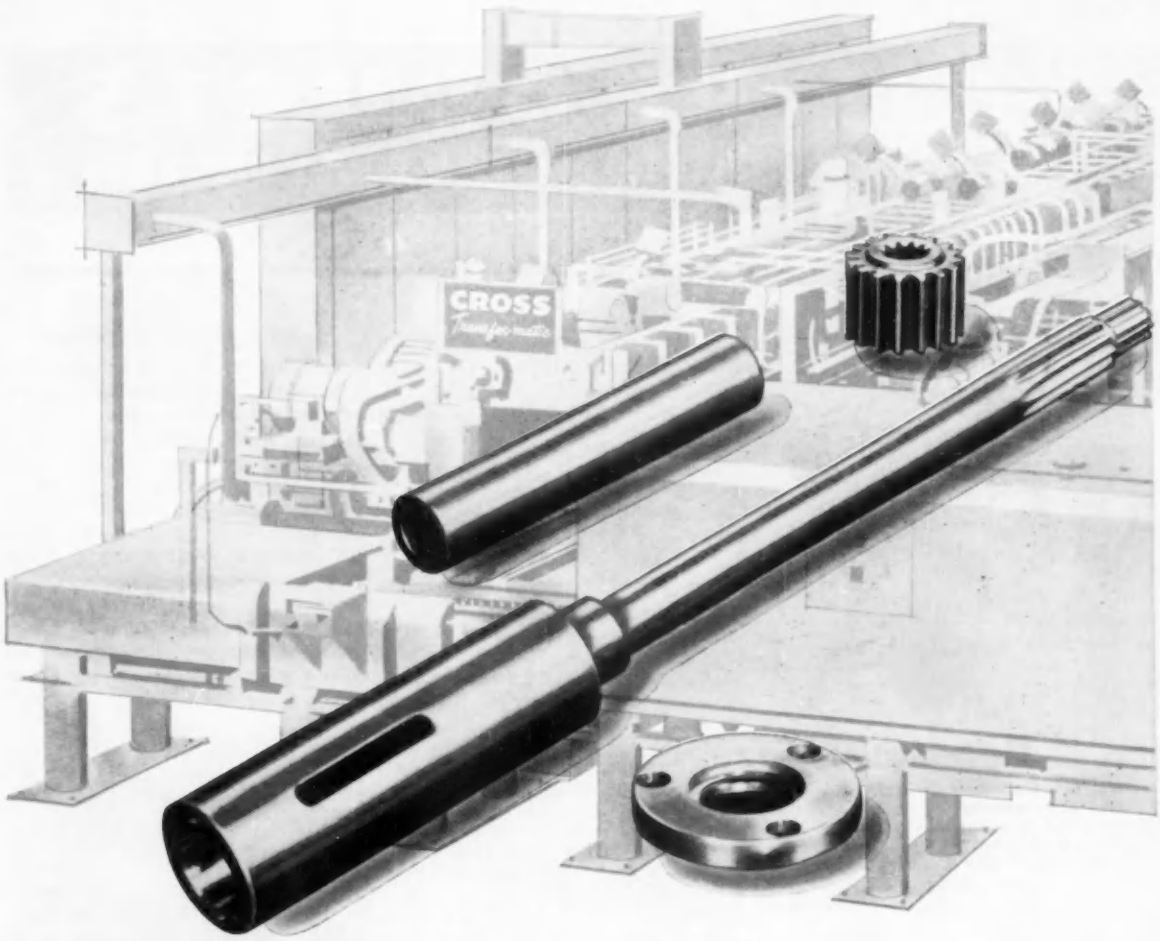

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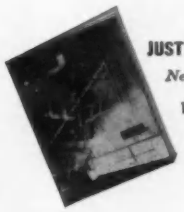

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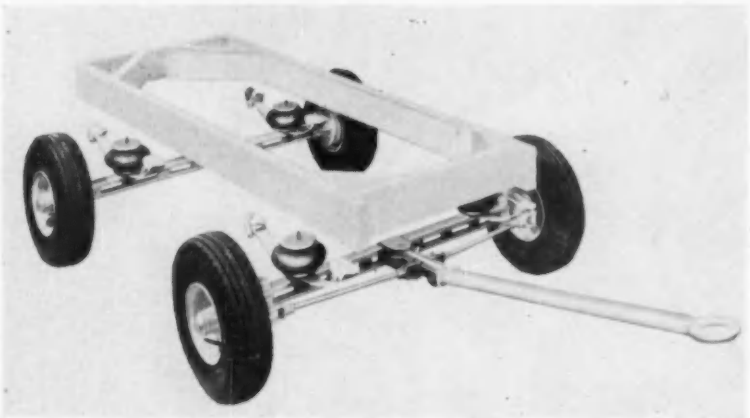


Lightweight Aluminum Running Gear

Lightweight aluminum running gear now in production features mechanically or hydraulically operated brakes and inflatable air springs. Identified by the name Air Flite, they were originally designed to meet military specifications for air transportation and palletized air drop. The springs can be inflated or deflated to meet varying load requirements. Automotive steering assembly provides positive trailing at high and low speeds. (The United Mfg. Co.)

Circle 90 on postcard for more data

Anti-Skid Device

Impending skid resulting from aircraft wheels locking and sliding when the brakes are applied can be eliminated with a new anti-skid device recently announced.

The main sensing portion is a rotating flywheel complete with governing fly bars which rotate within a small light weight housing. This flywheel is driven by a friction drive which makes contact with the rim of the airplane wheel or it can be located in the axle to be driven directly through an attachment to the hub cap.

If an impending skid, indicated by an abrupt slowing down of the airplane wheel occurs, action of the flywheel controls an opening of the brake release valve. The pressure is gradually restored to allow it to regain rpm consistent with ground speed. One anti-skid unit is installed at each braked wheel. It operates independently, cycling only when the wheel which it controls radically decelerates in rpm.

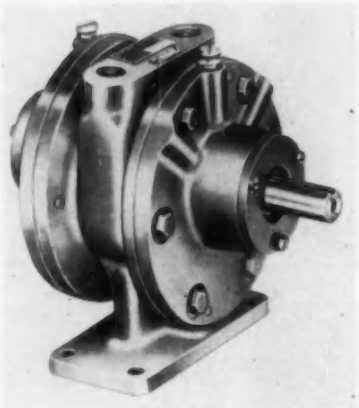
Advantages claimed for the new equipment are said to include the prevention of aircraft wheel skidding, reduction of airplane stopping distance and the elimination of uneven tire wear. *Bendix Products Div., Bendix Aviation Corp.*

Circle 91 on postcard for more data

Reversible Air Motor

For applications such as pneumatic lifts or machine positioning where a reversible rotation feature is advantageous, a new reversible model rotary air motor is being offered. Called Model 6AM, it is available in the ½ to 2-hp. range. Any four-way operating valve built for pressures below 100 psi may be used for control. Motor ports fit ⅜-in. standard pipe connections.

Models with single rotation, either right or left, are also offered and have similar dimensions and performance ratings. All models weigh about 17 lb, and are variable in speed from 300 to 2000 rpm on air line pressures from 30 to 90 psi. *Gast Manufacturing Corp.*



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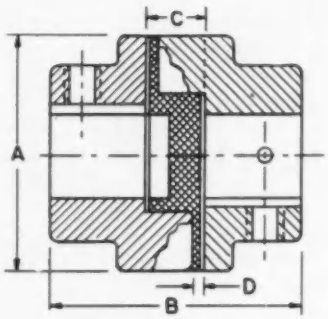
Rubber Mountings

Bonded rubber vibration and shock control mountings produced to operate efficiently from —65 to 300 F are now being marketed. Transmissibility at resonance is three or less at 68 F. At 300 F it is less than 3.5. The new elastomer is resistant to oil and ozone. Applicable in the aviation industries, the one piece construction provides mountings of minimum weight and size. *Lord Mfg. Co.*

Circle 93 on postcard for more data

Flexible Coupling

Using a one-piece spindle-type load cushion, a new cast aluminum flexible coupling features lightweight, long service life and minimum maintenance. The load is transferred entirely by cushion compression, eliminating wear and abrasion on the metal jaws. Since only the load ends are under compression on non-reversing loads, the entire spider may be reversed for double service life. No lubrication is required.



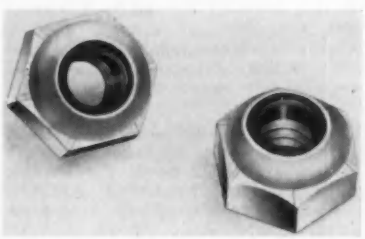
Cushions are made from Buna-N, oak tanned leather, Bakelite, or Bakelite/Buna-N combinations. Depending upon choice of cushioning materials, the coupling may be equipped for exposure to oils, chemicals, water, steam and abrasion.

Body of the coupling consists of two aluminum castings. Total weight is about ⅓-lb. The L-075 coupling is rated for loads of 1/10-hp at 100 rpm, up to 2 hp at 3600 rpm. Bore sizes range from ¼ to ⅜-in., in 1/16-in. increments. Dimensions are 1¾-in. OD by 2⅛-in. overall length. *Lovejoy Flexible Coupling Co.*

Circle 94 on postcard for more data

Nylon-Insert Locknut

A die-cast zinc-alloy hex nut body and a molded nylon compression collar are incorporated on a new line



of nylon-insert locknuts. The nut body is made of rustproof corrosion resistant zinc-alloy which can be used for most applications, either indoors or outdoors, without a protective finish.

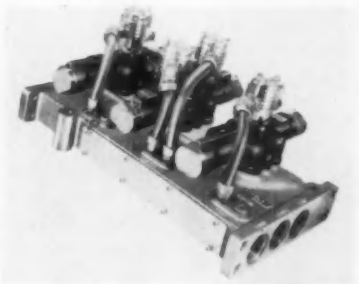
The locknut will not damage mating screw threads. All commercial plated finishes are available. The collar is impervious to practically all chemicals, solvents and weathering conditions. A complete range of thread sizes is available. *Gries Reproducer Corp.*

Circle 95 on postcard for more data

Multiple Manifold

Designed to provide compact group mounting of basic ¾ in. type Speed King 2, 3 and 4-way pilot operated control valves, a new high capacity, multiple station manifold has been announced.

The new cast aluminum manifold, offered in two and three station types, has full length inlet and exhaust ports, common to all valve stations. A conduit passage for electrical wiring, with a removable cover for access to connections, also runs the full



length of the manifold. Inlet, exhaust and wiring passages all are 1¼ in. NPT. Dirt and moisture proof flexible conduit encloses pilot solenoid leads. To facilitate piping, manifolds are machined for both side and bottom cylinder porting. Either ¾ or 1 in. NPT port size is optional.

Adaptable to any type of control valve application, the new manifold permits mounting of any combination of single or double solenoid Speed King valves at any desired location on the manifold. Two, three and four-way valves can be combined as required. Speed King valves with remote operated, speed control and power centered neutral options also can be used. (Valvair Corp.)

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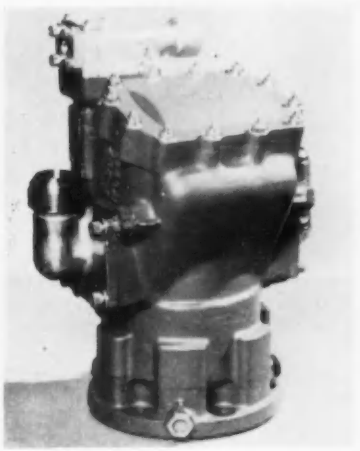
Hydraulic Pump

Capable of continuous operation at 4000 psi is a new variable-displacement piston-type hydraulic pump. The



pump can operate in hydraulic fluids and engine lubricating oils with particle sizes up to 40 microns.

Design features include axial pistons reciprocating in a revolving cylinder block suspended by a trunnion-mounted yoke. Piston stroke is varied from zero to maximum by changing the angle of the yoke. *Vickers Inc.*

Circle 97 on postcard for more data

Industrial Gloves

Industrial gloves treated with PVC (polyvinyl-chloride) which are abrasive and chemical resistant are now available. They are said to resist virtually all solvents and chemicals encountered in industrial use such as acids, alkalis, fats, greases, oils, petroleum products, alcohols and waxes. They will not crack or peel and are non-flammable and non-oxidizing. Obtainable in a full range of men's and women's sizes, they are furnished in a wide variety of styles. Controlled PVC-impregnated clothing and aprons having light weight and flexibility are also offered. *Jomac Inc.*

Circle 98 on postcard for more data

Lamp Gasket Material

Compounded of sponged butyl synthetic rubber and ground cork, a new material for automotive lamp gaskets is now obtainable. Called Armstrong YK950, it will compress 25 to 40 per cent under a flange load of 40 psi. Butyl is said to give it good resistance to ozone, while the cork particles give it resilience. It is manufactured in sheets. *Armstrong Cork Co.*

Circle 99 on postcard for more data

Arc Welding . . .

Continued from page 73

moved to a straight line automatic welder where the external longitudinal weld is made at a still higher speed.

After the longitudinal weld is completed, heavy end plates, that are other components of the spider assembly, are tack welded in place and the spider is placed on a positioner beside the welder, Fig. 5, where external circumferential welds are made in deep V-grooves. This machine uses an automatic head feeding 3/16 in., L-60 wire.

Internal spider welds not accessible for either "Squirt" or automatic welding are made by hand, using iron powder type electrodes (Fig. 6). This type of rod, class E-6024, is now employed in the shop for nearly all welding that cannot be done with "Squirt" or fully automatic machines. For low alloy steel, such as SAE 4130 and 8620, a low hydrogen iron powder electrode is used.

In general, experience with iron powder electrodes has proved economies ranging from 15 to 25 per cent over other type electrodes, chiefly because welding is faster and more metal can be deposited per hour. Besides this, there is less tendency to cracking and less weld spatter occurs; hence, less cleaning is required. That needed is more easily done. There is also less fatigue for the operator, largely because he can drag the electrode.

In this shop, maximum economies result by positioning iron powder work for downhand welding. Stator frames of locomotive generators are now being fabricated from steel components (chiefly rings that are rolled from flat bar stock). These frames have replaced cast aluminum stator frames that, for a time, were employed in preference to cast steel. Aluminum frames are the lightest of all, but the steel weldments cost less and their extra weight is not a detriment in this application.

Many rings produced in the Allison weldery have flash welded joints which have the advantage of being made rapidly without scarfing. As in all such welds, however, much flash is produced around the joint, and its removal by air chisel, slag grinding, or oxy-acetylene burning is slow and expensive. This removal is now effected with considerably greater economy by use of a carbon arc, as in Fig. 7. A conventional hand torch is used to hold the carbon electrode and the work is done much more rapidly than by conventional means.

Fig. 5 (TOP)—After flanges are tack welded to the cylindrical shell of a spider, the weldment is mounted on a positioner for rotation under the head that makes external circumferential welds in the deep grooves provided. Flux is held in position by a copper brush.

Fig. 6 (CENTER)—Making manual welds inside the shell of a spider assembly while it is mounted on rollers for easy hand rotation. This makes it possible to do the welding in convenient downhand position, permitting maximum economies from the iron powder type electrode being used.

Fig. 7 (LEFT)—Removing the flash from a flash-type, resistant weld that has joined the two ends of a rolled steel ring. A hand torch equipped with a carbon electrode produces an arc that cuts away the flash rapidly.

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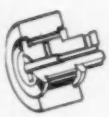

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Built to "FOLLOW THROUGH" under high shock loads

Every feature of the Torrington Cam Follower is designed to insure efficient performance and long service life under heavy rolling and shock loads in cam or track follower service.

Precision made throughout, Torrington Cam Followers are available in sizes from ½" to 2¼" OD. Special surface finishes such as chrome and cadmium plate or oxide black can be provided.

Our engineering staff will be glad to work with you in applying these reliable units to your cam-controlled or track-type equipment. You can depend on Torrington Cam Followers to "follow through" on the job because every element is designed for ultimate capacity. *The Torrington Company,* Torrington, Conn.—and South Bend 21, Ind.

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METALS

Steel Scrap Prices Continue to Decline. Improvement in Sales of Copper. Aluminum Fabricators Seek New Markets.

by William F. Boericke

Second Best Year for Steel

Confidence in an upturn in the steel operating rate for the fourth quarter has been shaken by the failure of the automobile makers to come into the market for the large tonnages expected for production of the new model cars. By mid-October it was reluctantly admitted that new orders had been disappointing thus far. While some improvement was evident over the third quarter the pickup was slow. The operating rate of 82 per cent was no higher than the September average and compared with 87.2 per cent in the second quarter and 96 per cent in the first quarter of the year.

Nevertheless, steel output for the first nine months of 1957 registered a new all-time high total of 87.7 million tons of ingots and steel for castings, which at least virtually assures that 1957 will end up as the second best year in the industry's history. The decline in the operating rate compared to last year has no particular significance as the 1956 rate was based on a capacity of 123 million tons while this year's is 134 million. By the end of the year it will be up to 141 million tons.

Operating Rate Varies

Of more concern is the fact that the operating rate at present varies widely for the different producers. Some of the larger mills are operating well above the average. Thus Bethlehem Steel is believed to be operating between 85 and 90 per cent principally because of its large capacity for heavy products which continue in stronger demand than the lighter steels. In general there appears to be a fairly wide diversity in operating rates among the various companies. Obviously, if the larger concerns are running at more than the industry's average, the smaller companies are operating at lower rates and perhaps approaching no more than a break-even point.

No Scarcity Of Steel

Steel consumers are fully aware there is no scarcity of steel and have let their inventories drop, perhaps dangerously low. They believe that steel is ready for them when they want it and are insisting on quick deliveries from their suppliers to keep their stocks in balance. Delivery time has become a prime competitive factor in securing an order. More emphasis is being placed on quality, and specifications are being rigidly adhered to.

There is even some doubt that the present operating rate is being supported by incoming orders. Some believe that it is maintained by pulling down on backlogs. If this is true, production is likely to decline below the present level later on. If production were confined solely to new orders received, it is reported that certain steel-producing areas would be down to 70 per cent capacity. Early in October the Youngstown field had taken five open-hearth furnaces out of commission because of lack of orders.

Improved Demand Believed Ahead

No doubt the late introduction of the new car models has caused revision in the estimates of the steel makers. But it is still confidently held that this is only a postponement of strong demand, and heavy orders will be placed in December and will continue thru the first quarter. The feeling in the trade is that an all out effort will be made by the automobile makers to get a maximum number of cars into dealers hand before a possible interruption to production resulting from wage negotiations in mid-1958. If this policy is followed it would call for heavy shipments of flat rolled steel at present in easy supply.

Structural Price Cut

Practically the only steel products in short supply today are wide flanged beams and heavy plate. Structurals have been in strong demand all year, hence it came as a shock to confidence when Lukens Steel, third largest producer of steel plate, suddenly reduced its base price of carbon steel plate by $8 per ton to $102. The company declared that a lower cost of raw material, by inference steel scrap, permitted this reduction. It brought the company's price in line with that of most of its major competitors for this product. Company officials asserted it was operating at full capacity for heavy and specialty steel plate and expected to continue to do so into 1958. Nevertheless Lukens action precipitated a lot of pessimistic comment by trade observers.

Steel Scrap Market Depressed

Steel scrap dealers have been unceasingly singing the blues since spring and with reason. Scrap prices by mid-October were down 50 per cent or more in less than a year's time. In Pittsburgh No. 1 heavy melting scrap declined $14 a ton in less than two months and sold at $24 under the January high.

(*Turn to page* 106, *please*)

YESTERDAY...

when compression ratios were 3 to 1, any good oil ring would do... as in this 1912 Multiplex Car that numbered among its features a 50 H.P. four-cylinder engine, a selective 4-speed transmission and rear wheel brakes—either of which was "powerful enough to slide the rear wheels". Selling price for touring car was $3,600, f.o.b. Berwick, Pa.

TODAY...

U. S. patents 2,635,022 and 2,695,625

It takes the PC type "98" chrome oil ring!

The Perfect Circle Type "98" Chrome oil ring was specifically designed to meet the exacting demands of today's high-compression engines. Featuring universal application, bottomless and conventional grooves, all depths, the PC Type "98" oil ring was the first to have a patented side-sealing action with multiple tiny springs that exert both side and radial pressure. And of utmost importance, Type "98" Chrome Oil Rings provide maximum oil drainage! Perfect Circle Corporation, Hagerstown, Ind.; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ont.

PERFECT CIRCLE

PISTON RINGS

Preferred by more people than any other brand!

METALS

(*Continued from page* 104)

Prices were down to $43 a ton and even lower in other steel areas. The IRON AGE composite price of scrap is off about 40 per cent from last December's all-time high of $65 per ton. Chief reason advanced for the price slump is that the mills are loaded up with scrap and have little interest in new buying. Export demand has slowed down and there is a greater use of pig iron by mills in charging furnaces. Scrap markets are watched for indications of near term changes in steel making rates. They have proved a useful barometer many times in the past but they are not infallible.

Copper Sales Improve

Copper sales have improved, and orders for October delivery were 10,000 tons ahead of September. Fabricators report there is considerable demand for immediate delivery, which indicates that customer's inventories are low. Buyers are fully aware that copper stocks are extremely large and that they will experience no delay in getting prompt shipments, hence they are making the fabricators carry their normal inventories of metal for them. The situation is not much different from what prevails today for certain steel products.

Selection Trust To Sell On Open Market

The feeling in the trade is that copper prices have hit bottom, both here and abroad. The producers' 27-cent price had held without change for over six weeks by mid-October, and on the London Metal Exchange the price was more than a cent above the September low. There was considerable interest in the announcement that the Rhodesian Selection Trust would resume selling its copper in London to British industry on prices based on the London Metal Exchange daily quotations. This was the end of a 2½-year fixed price sales policy, instituted in May, 1955, with the avowed purpose to impart stability to the copper price and avoid wide fluctuations. This was praiseworthy, but it was not successful. It found no favor with the other big Rhodesian producer which continued to sell on L.M.E. prices, usually below the fixed price of the Selection Trust, and on request of the British Non-Ferrous Metals Federation, representing many British copper consumers, the Selection Trust fell in line. With the R.S.T. fixed price eliminated, there will be less confusion in scanning the world's copper markets from day to day.

While no new long-term production cutbacks have been announced at the mines, there have been a number of interruptions that in the aggregate add up to a sizable total. Three of Kennecott's western mines have been shut down for repairs and the big White Pine operation in Michigan has been closed by a strike.

Aluminum Seeks New Markets

Aluminum fabricators are fighting hard for new markets. Confronted with undeniable over-production, they are making every effort to find new sales outlets. The industry's invasion into the metal can field is the latest example. It was announced that Reynolds Metals would sell to Esso Standard Oil Co. between 35 and 60 million quart size cylindrical cans for motor oil. Reynolds would collect from Esso service stations the scrap aluminum resulting after the cans were emptied. Not to be outdone, Continental Can will offer aluminum cans produced by conventional can-making processes from aluminum plate. They are expected to find their greatest use as containers for products requiring a package with eye appeal. Now that aluminum supply is ample, it is expected the new market will show great expansion.

Net shipments of aluminum sheet and plate for the first eight months of this year totalled 443,500 tons, as reported by the Aluminum Association.

Lead Price Cut

Wholly unexpected was the action of the custom smelters in cutting the lead price October 14 from 14 to 13½ cents. Lead had been considered to occupy the soundest statistical position of all the nonferrous metals. For the first eight months of 1957, primary production had been no more than in the same period of 1956. In August, shipments by U. S. producers increased by 11,100 tons over July, and stocks were reduced by 7300 tons. Battery and ethyl sales continued good with shipments of replacement batteries the largest for two years.

It takes about 770 gal of water to refine each barrel of crude oil — enough water to suds and rinse 43 loads of family wash in the automatic washer.

•

America's industries will require 450 billion kw-hr of electrical power in 1963.

•

Twenty per cent of all money earmarked by American industry for research and development programs today is being spent by the electrical manufacturers of the nation.

•

In 1956, there were 2368 million Americans injured in traffic accidents.

•

Speeding was blamed for 13,830 deaths on U. S. highways in 1956.

•

In 1956, more than 8000 pedestrians were killed by cars in the U. S.

•

Men were drivers in 89.7 per cent of fatal accidents on U. S. highways in 1956.

USING

DU PONT ELASTOMERS

neoprene · Hypalon®

in design

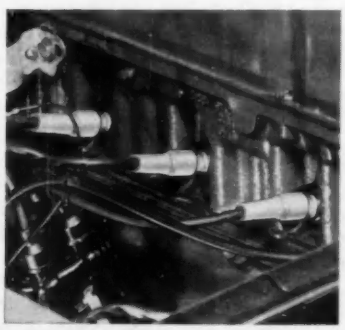
30 feet of neoprene tubing operate a new heating system

HYPALON solves some heat and ozone problems for resilient materials

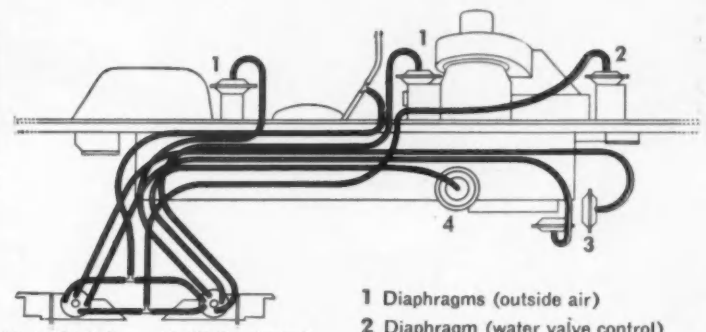
HYPALON is completely unaffected by ozone and, compared with other kinds of rubber, also shows unusual resistance to hardening at elevated temperatures (250°-350° F.). These two facts offer new opportunities to design engineers when considering resilient materials in today's high-powered engines.

HYPALON is currently used in molded spark-plug boots and ignition cable jacketing. In these applications, the superior resistance of HYPALON to heat, plus complete ozone resistance, makes it the logical choice. HYPALON is most economical in the long run, because it adds so much extra service life to parts exposed to ozone and heat.

Outstanding resistance to heat and ozone are just two of the properties that make HYPALON an important elastomer in automotive design. HYPALON also resists deterioration from sunlight and weathering . . . and it can be compounded in a wide range of light-stable colors. Mail coupon for more information on the properties and uses of this newest Du Pont synthetic rubber.



MOLDED spark-plug boots of HYPALON withstand high temperatures, are unaffected by ozone.



1 Diaphragms (outside air)
2 Diaphragm (water valve control)
3 Diaphragm (control louvers)
4 Diaphragm (heater ventilation)

Neoprene chosen for its resistance to heat, oil, ozone, aging

A network of neoprene tubing helps make heater operation in one manufacturer's 1957 models simple, sure and effective. The system is push-button controlled and vacuum actuated. 30 feet of neoprene tubing operate from the vacuum pump to control a series of diaphragms which regulate air and water flow and ventilation louvers. This tubing also controls ventilation and refrigeration in air-conditioned cars.

Neoprene was specified for heater tubing because no other rubber material matches neoprene's resistance to engine heat, oil mist, ozone and aging. This balanced combination of useful properties contributes to long, trouble-free heater service.

Many other automotive uses

Heater tubing is just one of the automotive uses for versatile neoprene. You'll also find this Du Pont synthetic rubber in seals, gaskets, hose, wire jacketing, flexible couplings and many other parts. Neoprene offers broad opportunities for designing new products and improving old ones. Just mail the coupon for full information.

DU PONT

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HYPALON *is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)*

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☐ I am particularly interested in _____

☐ Send me a free copy of *The Du Pont Elastomers* (a review of properties of neoprene and HYPALON).

☐ Add my name to the free mailing list of the *Elastomers Notebook* (contains articles based on uses of Du Pont elastomers in industry).

E. I. du Pont de Nemours & Co. (Inc.)
Elastomer Chemicals Dept. AI-11
Wilmington 98, Delaware

Name _____ Position _____

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City _____ State _____

Studebaker's Expanded Truck Line

Studebaker's new one-ton truck

STUDEBAKER'S Transtar truck line for 1958 ranges from half-ton pickups to two-ton heavy-duty models.

Four engines will be offered for the company's trucks in 1958. A 259-cu in., 170-hp V-8 is available in the half and three-quarter-ton models, and a 289-cu in., 182-hp V-8 will be used in the heavy-duty units and as optional equipment for the two-ton medium-duty model. This engine also is optional in the one and one-and-a-half-ton models.

Optional four-barrel carburetion will widen power choices available, increasing horsepower to 178 and 192 respectively for the 259-cu in. and 289-cu in. V-8 engines.

Two six-cylinder engines are available in the light-duty models; the 185-cu in., 92-hp and the 245-cu in., 106-hp power plants.

Torque rating is 250 lb ft for the light-duty truck V-8 engine at 2800 rpm. The big V-8 engine is rated at 288 lb ft of torque at 2600 rpm. Compression ratio for all Studebaker truck engines this year is 7.5 to 1.

In the light-duty line, wheelbases of 112, 122, and 131 in. will be available with gross vehicle weight ratings from 4800 lb in the half-ton model to 10,000 lb in the one-tone model. A four-speed synchromesh transmission will be standard on the one-ton, and Studebaker's automatic transmission will be optional on this model.

In the medium-duty line of one-and-a-half-ton and two-ton trucks, four wheelbases will be available ranging up to 195 in. for the two-ton model. The 195-in. wheelbase is designed to accommodate 16 to 18-ft vans, stakes or special bodies. Other models include factory installed 9-foot through 14-foot stake and platform bodies. Gross vehicle weights on the two-ton models are 16,500 lb on the 155-in. wheelbase model and 17,000 lb on both the 171-in. and 195-in. wheelbase models.

In the heavy-duty line there will be four chassis and cab models. Factory installed platform-stake bodies will be available in 9, 12, and 14-ft lengths. Wheelbases of 131, 155, 171 and 195 in. will be used. Gross vehicle weights are 18,000-19,000 lb. The power train will include the 289-cu in. V-8 engine, four-speed heavy-duty synchromesh transmission, and an 11-in. clutch.

Heavy-duty front axles with a carrying capacity of 5,000 pounds and rear axles with a carrying capacity of 15,000 pounds will be used with these new units. A 6.8 to 1 rear axle ratio will be standard with a 6.2 to 1 ratio optional at no extra cost. Two-speed rear axles with electric shift will also be available.

A special engine package including many of the standard heavy-duty features of the 289-cu in. engine will be available with the 245-cu in. six-cylinder engine or the 259-cu in. V-8. The package includes heavy-duty inlet and exhaust valves, heavy-duty exhaust valve springs, and rotary cap kit, chrome-plated top compression piston rings and, on the 259-cu in. engine, heavy-duty aluminum timing gear, heavy-duty connecting rod bearings and crankshaft bearings, and a one-quart oil bath air cleaner.

Chassis on the Transtar line include shorter frames with a 102-in. bumper-to-back-of-cab dimension. Power brakes will be offered on models in all weight classifications. The booster for light-duty usage is a 6¾ in. Hydrovac. Linkage-type power steering will be available for the first time in the line and will be optional with all V-8 powered trucks in the one-ton and over classifications. The non-slip Twin Traction safety differential again will be optional equipment on the half-ton models.

Philadelphia Automobile Show Is Slated for November 16-23

All American models of 1958 passenger cars will be displayed at the Greater Philadelphia Automobile Show, to be held at Convention Hall from Nov. 16-23. The show will also feature foreign cars and trucks.

In addition to car and truck manufacturers, exhibitors will include oil refineries, tire and battery manufacturers, and other suppliers of automobile accessories.

The show, first of its kind in the city's history, is sponsored by the Philadelphia Automobile Trade Assn.

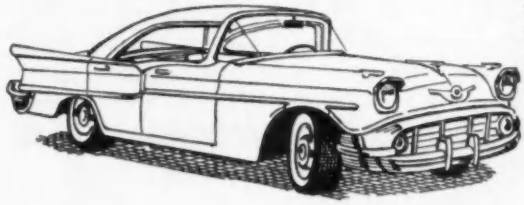
Rapidly becoming the

Standard of the Automotive Industry

INCREASES ENGINE LIFE UP TO 400%

STERLING'S great "Conformatic" piston with "Intra-Cast" steel ring groove liners give sensationally longer life to rings and grooves—

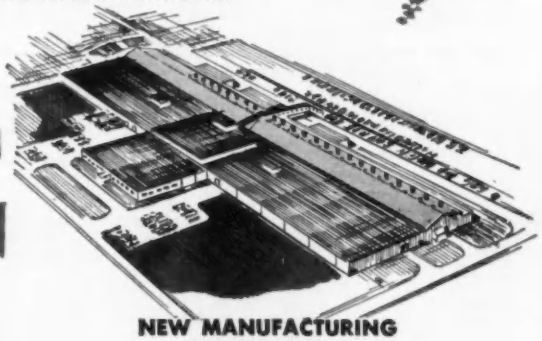
Recommended clearances for "Conformatic" pistons are from 0 to ½ thousandth inch. This clearance is maintained hot and cold providing unbelievable bore stability.



Sterling's revolutionary *Conformatic* piston already has been accepted and is now being used in a number of America's finest and most popular passenger cars.

STERLING'S CONFORMATIC PISTON WITH INTRA-CAST STEEL LINED GROOVES

prevents frictional horsepower loss, reduces oil consumption to an absolute minimum, and prolongs engine life up to 400%. *Intra-Cast* and *Conformatic* are registered trade names of STERLING Aluminum Products Inc.



NEW MANUFACTURING FACILITIES FOR STERLING ALUMINUM

120 acres! Completely new automated plant at the confluence of the Missouri and Mississippi Rivers

STERLING

ALUMINUM PRODUCTS INC.

ST. CHARLES, MISSOURI

SA-1

WORLD'S LARGEST MANUFACTURER OF ALUMINUM ALLOY PISTONS

• • INDUSTRY STATISTICS • •

1957 WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending Oct. 12	Weeks Ending Oct. 5	Year to Date 1957	Year to Date 1956
PASSENGER CAR PRODUCTION				
Hudson	.....	.....	1,345	5,976
Nash	.....	.....	3,561	13,486
Rambler	3,129	3,052	73,228	61,873
Total—American Motors	3,129	3,052	78,134	81,335
Chrysler	1,271	1,279	98,771	80,576
De Soto	2,541	1,898	96,075	72,899
Dodge	5,476	5,204	237,119	145,011
Imperial	367	432	31,294	*
Plymouth	9,198	5,569	533,471	325,137
Total—Chrysler Corp.	18,853	14,372	994,730	623,623
Edsel	1,002	1,283	44,450	.....
Ford	0	334	1,184,896	977,754
Lincoln and Continental	0	600	29,698	38,505
Mercury	1,866	389	228,753	189,525
Total—Ford Motor Co.	2,868	2,606	1,487,797	1,205,784
Buick	2,891	9	301,374	428,782
Cadillac	15	15	120,943	114,993
Chevrolet	8,420	66	1,133,001	1,232,233
Oldsmobile	248	6	297,122	345,380
Pontiac	152	0	262,844	260,960
Total—General Motors Corp.	11,726	96	2,115,284	2,382,318
Packard	11	2	4,619	13,289
Studebaker	2,211	1,932	50,799	58,525
Total—Studebaker-Packard Corp.	2,222	1,934	55,418	71,814
Checker Cab	77	60	3,148	2,990
Total—Passenger Cars	38,875	22,120	4,734,511	4,367,864
TRUCK PRODUCTION				
Chevrolet	6,925	3,872	267,284	276,585
G. M. C.	1,497	97	52,099	72,507
Diamond T	133	99	4,399	4,146
Divco	60	60	2,439	2,977
Dodge and Fargo	1,161	1,249	61,046	69,997
Ford	5,066	1,398	269,479	241,955
F. W. D.	16	6	896	1,334
International	2,383	2,358	96,857	108,598
Mack	352	345	13,863	14,596
Reo	100	79	3,740	3,102
Studebaker	190	190	7,715	11,507
White	235	264	11,491	14,126
Willys	1,049	1,265	48,756	48,459
Other Trucks	70	80	3,370	5,429
Total—Trucks	19,237	11,362	843,434	875,320
Buses	45	35	3,224	3,531
Total—Motor Vehicles	58,157	33,517	5,581,169	5,246,715

* Included with Chrysler.

RETAIL CAR SALES BY PRICE GROUPS*

NUMBER OF CARS

Price Group	August 1957 Units†	August 1957 % of Total	August 1956 Units†	August 1956 % of Total
Under $2,000	1,336	.28	86,284	15.41
$2,001 to $2,500	308,399	65.23	317,399	56.69
$2,501 to $3,500	130,600	27.62	133,435	23.83
Over $3,500	32,480	6.87	22,792	4.07
Total	472,815	100.00	559,910	100.00

Price Group	Eight Months 1957 Units†	Eight Months 1957 % of Total	Eight Months 1956 Units†	Eight Months 1956 % of Total
Under $2,000	21,187	.53	748,211	18.10
$2,001 to $2,500	2,513,943	63.03	2,294,191	55.25
$2,501 to $3,500	1,131,188	28.36	933,644	22.59
Over $3,500	322,232	8.08	167,862	4.06
Total	3,988,550	100.00	4,133,908	100.00

DOLLAR VOLUME OF SALES

Price Group	August 1957 Dollars	August 1957 % of Total	August 1956 Dollars	August 1956 % of Total
Under $2,000	$ 2,040,072	.17	$ 169,301,324	12.90
$2,001 to $2,500	693,823,167	56.11	679,888,826	51.81
$2,501 to $3,500	369,682,930	29.90	364,819,656	27.80
Over $3,500	170,812,253	13.82	98,275,292	7.49
Total	$1,236,358,422	100.00	$1,312,285,098	100.00

Price Group	Eight Months 1957 Dollars	Eight Months 1957 % of Total	Eight Months 1956 Dollars	Eight Months 1956 % of Total
Under $2,000	$ 38,345,893	.37	$1,464,787,024	15.15
$2,001 to $2,500	5,648,962,479	54.10	4,909,379,688	50.77
$2,501 to $3,500	3,194,327,415	30.59	2,574,575,577	26.63
Over $3,500	1,559,582,697	14.94	719,963,364	7.45
Total	$10,441,218,484	100.00	$9,668,705,653	100.00

*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four-door sedan or equivalent model. Does not include transportation charges or extra equipment.

†—New registrations of American made cars only. Does not include imported foreign cars.

NEW REGISTRATIONS OF FOREIGN CARS

First Eight Months

1957		1956	
Volkswagen	40,902	Volkswagen	33,628
Renault	13,220	Metropolitan	4,420
British Ford	9,319	M. G.	3,171
M. G.	9,249	Jaguar	2,469
Metropolitan	7,809	Austin Healey	2,189
All Others	43,323	All Others	15,273
Total	123,822	Total	61,150

1957 NEW REGISTRATIONS

Based on data from R. L. Polk & Co.

NEW PASSENGER CARS

Make	August 1957	July 1957	August 1956	EIGHT MONTHS 1957	EIGHT MONTHS 1956
Ford	123,632	137,529	131,769	1,024,831	923,454
Chevrolet	117,744	135,452	145,680	975,592	1,092,517
Plymouth	54,926	59,623	44,976	430,319	346,515
Buick	29,767	31,624	51,404	279,395	390,526
Oldsmobile	28,643	28,932	41,852	256,870	318,347
Pontiac	25,035	27,380	34,318	223,996	257,249
Mercury	22,310	24,489	28,520	191,069	197,363
Dodge	22,589	24,991	21,568	183,713	155,331
Chrysler	10,794	11,723	11,623	98,089	85,423
Cadillac	11,079	11,435	13,517	96,248	99,007
De Soto	7,750	8,437	9,423	73,635	72,045
Rambler	7,326	9,863	8,656	61,129	49,875
Studebaker	5,784	6,742	6,950	43,703	57,642
Lincoln	2,644	2,562	4,483	24,534	30,406
Metropolitan	1,336	1,333	863	7,809	4,420
Nash	611	738	2,052	7,457	18,632
Packard	392	469	2,960	4,179	23,555
Hudson	265	368	867	3,855	8,864
Continental	37	41	127	575	1,178
Misc. Domestic	358	451	439	2,987	2,725
Foreign	18,827	19,062	8,273	116,013	56,730
Total—All Makes	491,839	543,264	568,320	4,105,978	4,191,804

NEW TRUCKS

Make	August 1957	July 1957	August 1956	EIGHT MONTHS 1957	EIGHT MONTHS 1956
Chevrolet	27,409	27,725	26,451	200,974	205,446
Ford	24,442	25,600	24,690	185,593	182,737
International	8,897	9,261	9,727	63,233	74,262
G. M. C.	5,341	5,292	7,021	42,680	57,591
Dodge	4,096	4,015	5,182	32,342	39,704
Willys Truck	1,124	1,258	1,174	10,001	8,858
White	1,154	1,165	1,133	9,094	10,610
Mack	1,171	1,257	1,222	8,995	8,965
Studebaker	506	540	778	4,835	6,554
Willys Jeep	602	548	766	4,238	5,542
Diamond T	305	308	330	2,332	2,762
Divco	182	199	234	1,864	2,218
Reo	157	190	237	1,543	2,026
Kenworth	57	122	152	691	913
Brockway	55	57	50	463	683
Peterbilt	43	50	49	361	412
F. W. D.	33	36	55	325	310
Misc. Domestic	65	66	97	569	737
Foreign	1,414	1,398	483	8,849	2,932
Total—All Makes	77,053	79,117	79,831	578,982	613,242

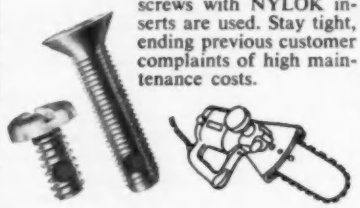
Continental has the cure for vibration "headaches"

the one-piece locking screw that won't work loose

HOLTITE® NYLOK Screws and Bolts are one of the many progressive ideas in fasteners pioneered by Continental. These one-piece, self-locking fasteners with the Nylon insert eliminate the need for lock washers, jam nuts, wiring, and similar devices. If you have fastening problems (like the applications below), for which Nylok is the practical solution, you can start now to save assembly dollars, and give your product a definite competitive advantage.

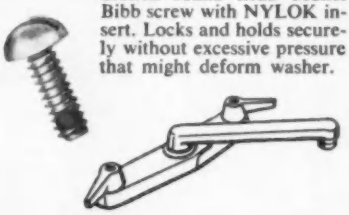
BEAT VIBRATION, KEEP CHAIN SAWS "ON THE JOB"

Several styles of machine screws with NYLOK inserts are used. Stay tight, ending previous customer complaints of high maintenance costs.



HOLD FAUCET WASHERS FIRMLY AT CORRECT ADJUSTMENT

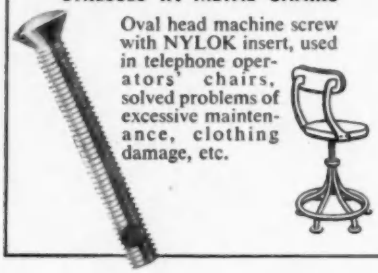
Slotted round head Monel Bibb screw with NYLOK insert. Locks and holds securely without excessive pressure that might deform washer.



HOLTITE® NYLOK® Self-locking Screws

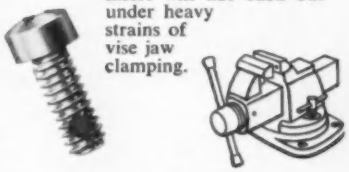
STAY TIGHT UNDER CONSTANT STRESSES IN METAL CHAIRS

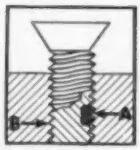
Oval head machine screw with NYLOK insert, used in telephone operators' chairs, solved problems of excessive maintenance, clothing damage, etc.



WITHSTAND REPEATED SHOCKS IN VISE JAW INSERTS

Phillips fillister head machine screw with NYLOK insert will not back out under heavy strains of vise jaw clamping.





HERE'S WHY HOLTITE NYLOK® LOCKS SECURELY

Resilient nylon plug (A) sets up a lateral thrust, smoothly wedges mating threads together (B). All locking action is on threads: head is not stressed. Locking is positive . . . seated or unseated.

CHECK YOUR ASSEMBLIES. Find out where Continental cost-saving ideas, like Nylok, can cut your assembly costs. Continental Assembly Specialists are fully qualified to analyze your operations and advise which fasteners — *standard or special* — can save you most. For prompt service, write or phone: Continental Screw Co., 451 Mt. Pleasant St., New Bedford, Mass.

CONTINENTAL
HOLTITE FASTENERS

HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING • THREAD CUTTING • SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS

One piece — no separate parts
Can be removed and replaced
Interchangeable — reusable
Locks seated or unseated
Acts as seal for gases, liquids

AUTOMATION NEWS REPORT

AUTOMATIC CONTROLS

PRODUCTION—VEHICLES—AIRCRAFT

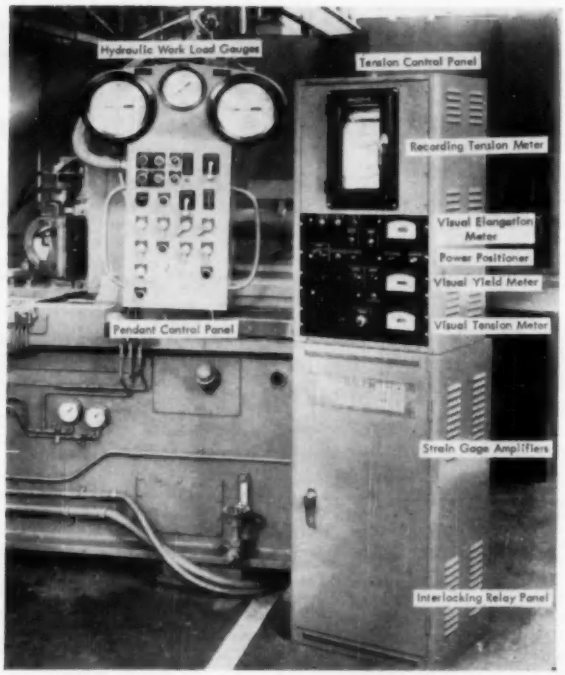
By Samuel Cummings

YIELD-TENSION MONITOR

A device to prevent metal fatigue in guided missiles has been developed by Cyril Bath Co. and turned over to the Army Ballistic Agency, at Huntsville, Ala., where it will be used in the production of Jupiter guided missiles.

Called the Yield-Tension Monitor, the device electronically controls the operation of the Radial Draw Former (also a Bath product) to insure uniform strength of the missile parts turned out by the machine. The monitor virtually eliminates, the company says, overstretching or breakage in such metals as titanium, magnesium, stainless steel, aluminum, and their alloys.

Bath Radial Draw Formers are used in plants producing guided missiles, jet engines, and high-speed aircraft to simultaneously stretch-form and compression-form extrusions, sheet, and strip to contour. Although the Draw Former operates well within the limits of most critical metals, studies by Bath engineers showed that hydraulic pressure in the machine could remain virtually constant while tension on the work piece varied considerably.



Tension control panel (shown at right) houses electronic units of Bath Yield-Tension Monitor, which measures the yield point of material to be formed by Bath Radial Draw Former and then continuously controls the tension forces imposed on the material during the forming process. The recording tension meter at top of cabinet provides a permanent record of tension maintained on the work piece throughout the forming cycle.

The Monitor is designed to measure and control these tensions in the process of forming. It operates as follows: A load cell is placed between the face of the ram and gripper head, which holds the work piece. The recorded measurement is the difference in resistance between the strain gage circuit and the constant dummy load. This result is fed into the strain gage amplifier, which then sends it through a bridging network to a power amplifier. The amplified signal is then fed to a servo motor to control an oil relief valve, which in turn varies the pressure within the working hydraulic cylinders. It is this control of oil flow which provides tension control to the machine.

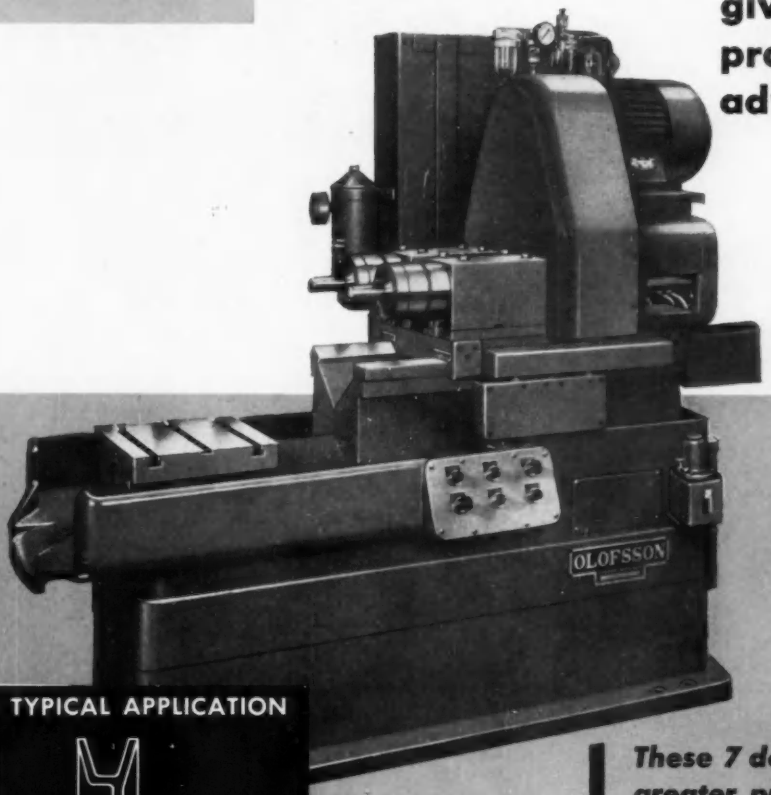
To compensate for starting load tension, two time control relays are incorporated in the control system. The first relay is activated as soon as the starting switch is operated. This sends an advance signal to the servo motor, which reduces tension momentarily to offset the starting load. When the point of proper tension is reached, the second time control relay starts the actual operation of the machine. (*Picture, above*)

(*Turn to page* 121, *please*)

Bell Telephone Laboratories engineers check control panel of Leprechaun, a new high-speed digital computer developed under Air Force Contract. (Story, page 121)

NEW design

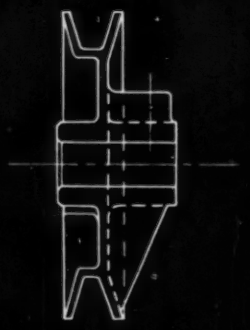
OLOFSSON Precision Boring Machine gives added production advantages



OLOFSSON Model 30-012 Single End Precision Way Boring Machine

PROVIDES FAST, ACCURATE ROUGH AND FINISH BORING, FACING, CHAMFERING, TURNING AND GROOVING.

A TYPICAL APPLICATION



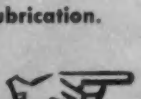
Finish bore, turn o. d., groove, and chamfer zinc die-cast pulley.

Rate of Production: 190 pieces per hour.

These 7 design features give you greater production efficiency . . .

1. New design provides low height to width ratio of spindles to ways.
2. Self contained hydraulic unit, separate from machine, for easy maintenance and elimination of heat problems.
3. Standard commercial hydraulic components throughout.
4. Nickel-iron, one piece ribbed base with integral fixture mounting pad and chip disposal basin.
5. Hardened and ground ways.
6. Conveniently located push-button control panel.
7. Forced feed lubrication.

FIND HOW THE 30-012 FITS YOUR REQUIREMENTS. WRITE FOR LITERATURE.



THE OLOFSSON CORPORATION

2730 Lyons Ave., Lansing, Michigan

MANUFACTURERS OF PRECISION BORING MACHINERY AND SPECIAL MACHINERY

Materials Handling Problems

discussed at

Westinghouse Conference

By
Charles A. Weinert

From the exit end of the 15 storage conveyors at Chrysler's Newark, Del., plant, bodies are selected for automatic deposit on a main floor conveyor by means of the control console illustrated.

MEANS for efficiently handling a wide variety of product transfer, including the vast conveyor system at Chrysler's Newark, Del., assembly plant, were discussed at the Sixth Biennial Materials Handling Conference sponsored by Westinghouse Electric Corp. Held early last month in the Westinghouse Appliance Div. plant at Columbus, Ohio, the two-day meeting was attended by some 200 representatives from industry.

Sixteen technical papers covered the design, control and/or application of materials handling equipment evolved for diversified purposes. The equipment discussed included conveyors, floating revolving cranes, bucket hoists, platform dumping lifts, rotary car dumpers, and stacking type cranes for warehousing. A double trolley gantry crane for handling open-hearth slag, and charging machines for steel mills were described. Proposed Navy overhead crane classifications and specifications were outlined. An automated lumber mill description was part of the program. The Pennsylvania Railroad facility at South Philadelphia for handling the transfer of iron ore from ocean-going vessels to hopper cars was another subject. Selected portions from the papers devoted to the Chrysler setup, and also from a paper covering the new Westinghouse line of standardized gear drives, are excerpted in the following.

Delaware Assembly Plant

J. G. Shepherd, plant engineer of Chrysler's Delaware automobile assembly plant, outlined the comprehensive system of conveyors in that facility. The plant has over 1,500,000 sq ft of floor space on one floor, all under one roof. There are 2½ miles of floor-type conveyors on which the bodies and chassis are conveyed, and over five miles of overhead monorail conveyors.

In setting up the transfer system, the objective was to eliminate all handling of bodies by hand, including shuttling in and out of storage banks. Emphasis was placed upon efficient movement of materials, proper scheduling, and precise synchronization of conveying components. This requires that all conveyors within a group be so synchronized that bodies will transfer automatically from one conveyor to the conveyor ahead, and also that all parts conveyors servicing these conveyors be synchronized with the main conveyor. It is accomplished by the use of synchro-tie units, synchro-tie generators, and magnetic amplifiers to control d-c voltages.

Mr. Shepherd was free to admit that the synchronization of conveyors has been successfully done before in a number of ways. He felt, however, that the system installed for depositing automobile bodies in banks of storage conveyors and selecting them as required for deposit on conveyors for succeeding operations, was a distinctive achievement at the Delaware plant. He cited, as an example, the movement of a body shell on its dolly from one conveyor to any one of 15 storage conveyors where it is counted into that particular storage line so the storage conveyor is not overfilled. Then, at the opposite end of the storage conveyors the body is selected by body style and other combinations required for proper production mix, transferred

(*Turn ot page* 129, *please*)

Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact . . . the qualities that they *pay* for—they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

ROEBLING

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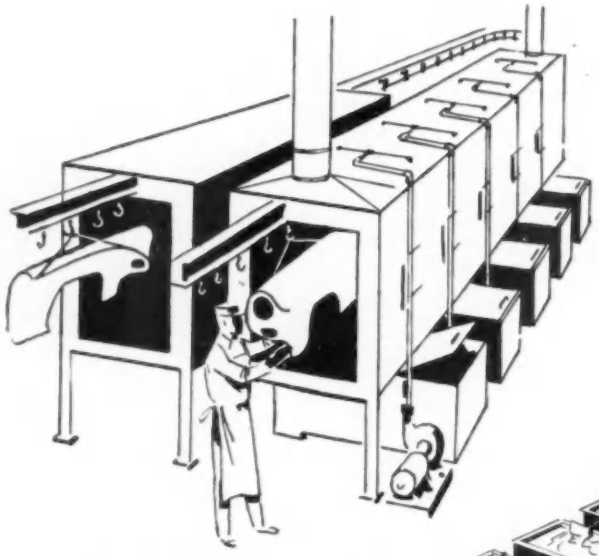
Roebling... Your Product is Better for it

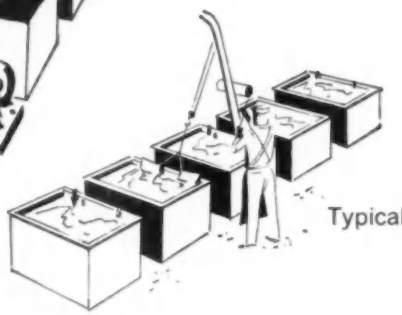
ACP Chemicals and Processes for the automotive industry

treat metals fast and economically



Typical power spray system

ACP produces the chemicals for treating most metals—to clean them, to prepare them for further processing, to improve corrosion resistance and paint adhesion. It has the experience and the personnel to apply these chemicals economically and effectively, too. Here are just a few of the many products and processes ACP offers:



Typical immersion system

ACP GRANODINE®—a phosphate coating process for steel which provides an excellent base for paint and greatly improves the corrosion resistance of the paint system.

ACP ALODINE®—an amorphous coating process for aluminum which protects both painted and unpainted metal and anchors the paint finish.

ACP PERMADINE®—a zinc phosphate coating chemical which forms a heavy oil-adsorptive crystalline coating on steel. This coating bonds paint or readily absorbs such rust inhibiting oils as ACP Granoleum.®

ACP DURIDINE®—a dual-action chemical which cleans and phosphate coats steel simultaneously. It carries off harmful surface dirt, oil and grease. It forms a coating which inhibits corrosion and provides an excellent base for the paint finish.

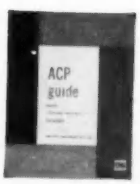
ACP DEOXIDINE®—a phosphoric acid metal cleaner which removes rust and organic soils, destroys rusters, prepares steel, aluminum, brass, copper and other metals for painting.

ACP METAL CLEANERS—Ridoline,® alkaline metal cleaner, and Ridosol,® solvent-detergent metal cleaner—remove metal preservatives and metalworking lubricants from metals in process.

ACP THERMOIL-GRANODINE®—a manganese iron phosphate crystalline coating chemical which improves the wear-resistant and antigalling characteristics of machined reciprocating ferrous elements. The coating, when oiled or painted, also inhibits corrosion.

ACP GRANODRAW® for steel and **GRANODRAW SS®** for stainless form an integral coating with the metal which facilitates cold mechanical deformation, improves drawing characteristics and lengthens die life.

Write for the "ACP GUIDE to the chemical treatment of metals."



Learn about the latest developments in metalworking chemicals. Visit us at the Metal Show, Booth 201.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY, Ambler 24, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

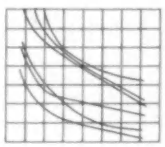
New Chemical Horizons for Industry and Agriculture

It isn't easy . . . the job of knowing exactly the right way to apply heat in the making of your product. That's what we're here for, to give you the right answers. Stay with us for five minutes and four pages and we'll give you an idea how Lindberg's answers can ease your job.

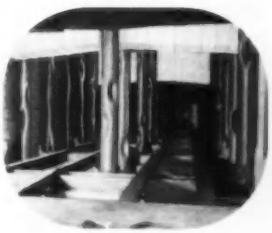
Applying heat to industry has been Lindberg's business for many years. But the way we've gone about our business is what's most important to you. First of all, Lindberg covers all phases of "heat for industry" in a much broader way than anyone we know in the field. So we can recommend just the right equipment, the correct techniques best suited to your individual requirements and your production methods. It's pretty significant, too, that over the years Lindberg has come up with many of the most vital improvements in the industry, frequently as an answer to customer needs for faster, more efficient, more economical methods.

We've kept ahead of the field because here at Lindberg we have been able to put together an exceptional creative staff of metallurgists, research technicians and engineers, the best in the business, we vow. Also, through our world-wide organization, with plants and subsidiary companies in many countries, we are always abreast of the latest industrial developments anywhere.

Here are a few examples of Lindberg innovations. Years ago Lindberg engineers pioneered and developed the famous Cyclone furnace, applying the first 100% forced convection heating principle for accurate, low cost tempering. This was followed by the introduction of the world's first high temperature (2200° F.) endothermic generator and the raising of 100% high speed convection heating into the high temperature field.



Modern heat treating methods owe much to Lindberg, what with the development of controlled atmosphere generators, the creation of dew point equilibrium curves to establish proper atmosphere values for type of steel and temperatures involved and the exclusive Lindberg Carbotrol to maintain these values automatically. For fuel-fired atmosphere furnaces we also perfected the "dimple" vertical radiant tube, a big step toward better furnace design. Provides more efficient heat application in more compact, less space-consuming furnaces. Portable, replaceable in a few minutes, this tube operates at maximum efficiency longer.

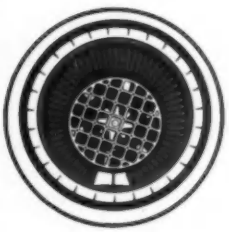


Lindberg Engineering Company

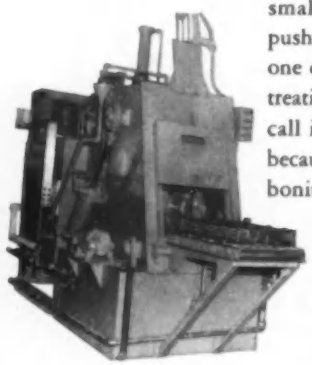
2450 WEST HUBBARD STREET • CHICAGO 12

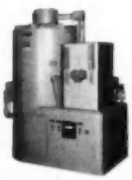
Scratch a new industrial heating idea and you'll find "Lindberg" every time. Our research and development engineers and technicians won't have it any other way. That's why they consistently come up with newer and better ways of making heat work for you in your industry, bless 'em.

You've probably heard a lot about Lindberg's wonderful new CORRTHERM electric heating element lately. It's quite a thing! It makes carbonitriding and carburizing with electricity practical, efficient and economical. CORRTHERM elements operate at extremely low voltage, eliminating leakage through carbon saturation, previously such a problem in electric atmosphere furnaces. With superlative heating units for either electric or fuel-fired furnaces you can be sure that Lindberg need play no favorite when recommending the equipment most practical, most efficient and most economical for your job.



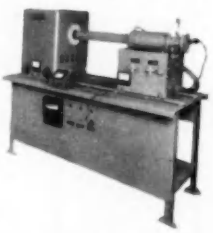
Our name is synonymous with carbonitriding and carburizing furnaces. We've built thousands of them, from small jobs up to big three-row pusher automatics. At the left is one of the most widely used heat treating furnaces in the world. We call it Lindberg's "Five-in-one" because it's ideal for five jobs, carbonitriding, carburizing, annealing, hardening and carbon restoration. Our Heat Treating Furnace Division has the experience, the knowledge and the courage to engineer and build furnaces to meet the precision requirements of any heat treating operation. We build them for carbonitriding, carburizing, hardening, tempering, normalizing, bright stainless annealing, brazing, carbon correction, nitriding, sintering, or what need you. Atmosphere generators, too, all types of them to take care of any heat treating operation requiring a protective atmosphere.





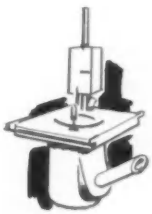
For research use Lindberg makes a broad line of heating equipment scientifically designed for maximum control and dependable operation, everything from simple hot plates to small heat treating furnaces actually usable for minor production jobs. An unusual Lindberg development for laboratory use is a High Frequency unit for carbon and sulfur determination.

New at Lindberg is a line of larger-than-lab, smaller-than-standard equipment designed specifically for pilot plant use. You can test your materials, your methods, on equipment moderately priced but production capable. Fuel-fired, electric and High Frequency units are included. At the right is an electric vacuum-type furnace ideal for testing this newest and most promising heat treating method. For complete details write our Pilot Plant Equipment Division.



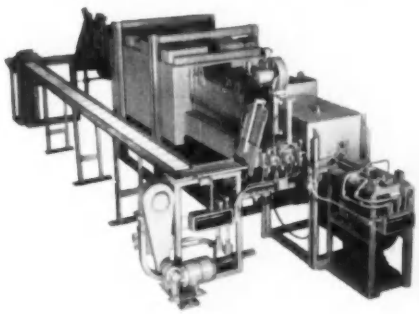
From a laboratory furnace no bigger than a breadbox to a car bottom furnace as big as a six-room house, there's no limit to what Lindberg can make heat do for you. Whatever product you make, if heat will make it better, there's a Lindberg furnace that's sure to do the job better.

Heat and aluminum have been Lindberg's twin babies for years. Our research and engineering staff has made a lot of innovations in this field, too, starting with the now famous two-chamber induction melting furnace introduced more than ten years ago. Most recent development is the Autoladle (we call it "Little Joe"), the first practical automatic aluminum ladling unit yet devised. Used with Lindberg melting and holding furnaces "Little Joe" makes automatic casting of aluminum fast, dependable and economical.



Lindberg's Melting Furnace Division makes a wide variety of melting and holding furnaces for aluminum, brass, bronze, tin, zinc, lead and other non-ferrous metals. These include aluminum reverbs, nose-pouring crucibles, electric resistance holding furnaces (illustrated at the right complete with "Little Joe" automatic ladling pump). For foundry, permanent mold or die-casting plant, independent or captive, there are Lindberg melting and holding furnaces to fit your requirements. If your problem in this field needs a special solution Lindberg's design staff can find it.

Suppose your industrial heating operation has to do with ceramics. We also offer you superior equipment for every ceramic application. Lindberg's long experience in applying heat and atmospheres to metals has been a natural background for the development of ceramic kilns for all purposes. Our Ceramic Kiln Division provides all types of kilns, big ones, small ones, electric or fuel-fired, standard or special, for electrical ceramics, abrasives, refractories, ferrites, sintering and



calcining, structural clay products and white ware. Shown above is an entirely new type of kiln, developed for the special requirements of electrical ceramics. It is completely automatic, atmosphere controlled with five zones of control for flexibility. In ceramics, too, our designers and engineers welcome the opportunity to develop special equipment to fit your special product requirement.

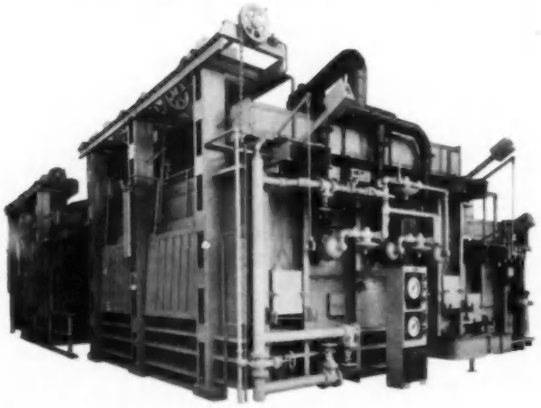
heat for industry

Bring all your questions to Lindberg at the Metal Show in Chicago. It's 9 to 1 our eggheads can answer them. Just look for "Lindberg" and "Booth 620". You'll find all the smiling faces there . . . in the low-pressure area. A cordial invitation, too, to visit our Chicago plant.

To round out the full measure of its service to "heat for industry" Lindberg is one of the largest makers of High Frequency heating units. Our "H-F" designers and engineers have made outstanding developments in this important heat treating field. For example, at the right is a remarkable-unit just recently completed for aluminizing automotive valves. It was designed vertically, saving 60% of floor space, and is completely automatic. No operator is required. It fits perfectly into an automated production line.

Our High Frequency Division provides units for hardening, brazing, soldering, annealing and many other processes and designs a variety of fixtures for application to "H-F" units. Lindberg also supplies a complete line of motor generators for all induction heating and melting applications. This equipment is available for M-G set frequencies of 1 KC., 3 KC. and 10 KC. and in power outputs from 30 KW. to 1250 KW.

Lindberg also specializes in field installation. We call this part of our business Lindberg Industrial. Whether your requirements call for the installation of a big one like the aluminum reverberatory furnace shown below or a complete heat treating department of smaller units, Lindberg will handle the job all the way. We specialize in "turn-key" installations, covering everything from design and engineering to the finished job. This includes all the construction needed to fit the equipment into your production processes.



Thanks for your attention to this brief story. For full details call your nearest Lindberg Field Representative (see classified phone book) or write us direct.

LINDBERG heat for industry

Lindberg Engineering Company, 2450 W. Hubbard St., Lindberg Industrial Corporation, 2321 W. Hubbard St., Chicago • Los Angeles plant, 11937 S. Regentview at Downey, California • EFCO-Lindberg, Ltd., Montreal, Canada • Lindberg Italiana, Milan, Italy The Electric Furnace Company, Ltd., Weybridge, Surrey, England • Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany • Toyo Menka, Tokyo • Lindberg Engineering Company (Australia) Pty. Ltd., Melbourne

Printed in U. S. A.

AUTOMATION News Report

(*Continued from page* 112)

LEPRECHAUN

A high-speed digital computer that can be used to conduct research on digital computers designed for military applications without building prototypes has been developed by Bell Telephone Laboratories.

Named Leprechaun, the new machine is not much larger than a home television set and requires less power to operate. This has been made possible by the use of transistors, which (excluding magnetic cores) make up more than half of Leprechaun's 9000 electrical components.

These components can be easily connected and disconnected. Thus, proposed new designs for digital computers can be laboratory tested without building new equipment, simply by rearranging Leprechaun's components to simulate the desired system.

Another feature of the new system is its transistor-driven, random access magnetic memory core, which provides almost instantaneous solution of problems. The machine can store 1024 words in its memory. These words, consisting of 18 binary digits, represent instructions or data to be used in solving problems and are immediately accessible.

One reason for building Leprechaun, laboratory officials say, was to demonstrate the feasibility of "direct coupled transistor logic." This is a switching circuit in which transistors are used to perform logic or "brain" operations as well as provide power. Although Leprechaun is still in the experimental stage, Bell Telephone engineers expect that the techniques developed in its construction will have many future applications.

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1958 BUICKS

(*Continued from page* 49)

on the others. Buick brakes are 12-in. in diameter both front and rear with 2½-in. lining width in front, 2¼-in. in the rear.

The FlightPitch Dynaflow is standard on Series 70 and 700, optional on the others. It embodies three turbines in a five-element torque converter. Maximum starting ratio is 4.5 to 1. Two turbines are connected individually to the output shaft through elements of the two planetary gear sets, while the third turbine is direct connected to the output shaft. Supplementing the turbines is a multiple-pitch stator which provides an infinite number of positions from low to high angle. Blade position is shifted to the best angle for performance and feel by a control system responding to throttle position.

Both the first and second turbines drive the output shaft independently, the first through the rear sun gear, the second through the front ring gear. The third turbine drives the output shaft by direct mechanical connection through the front and rear planet carriers. When the car is started, the converter pump produces the driving force impressed on the first turbine. As car speed increases, the first turbine gradually comes out of play and the second turbine increases its effect. As car speed increases further both the first and second turbinee become relatively inactive and the output shaft is driven by the third turbine.

At road loads up to 70 mph the multiple-pitch stator remains in low angle. Full throttle operation puts the blades in high angle. Most important feature, however, is that for part-throttle accelerations above 40-deg throttle opening, the blades shift to intermediate positions between high and low angle as established by throttle opening. This results in greatly increased part throttle performance.

All clutching elements of this drive are of friction plate type. The drive has four clutch assemblies: neutral, drive, reverse, and grade, the latter being employed for downhill retarding.

Oil pressure to apply clutches and circulate lubricating and cooling oil is modulated in accordance to throttle opening. Consequently, the power required to pump oil is reduced to a minimum under light loads. The toggle linkage in the parking lock mechanism is of roller type, decreasing friction to a minimum.

One of the major structural features of the new drive is the one-piece permanent-mold aluminum casting combining the transmission case and flywheel housing. Other aluminum parts made from die-castings or permanent-mold casting are: the rear bearing retainer, clutch pistons, rear support, valve body, and turbine elements. Use of aluminum parts has reduced the weight of the new unit by 30 lb as compared with the standard Dynaflow drive.

In summary, the Air-Poise suspension has the following features: variable rate suspension; automatic leveling; automatic trim control; a manual shift feature which makes

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Here is an intricately formed tapered pin for off-road equipment. It weighs 40 pounds. Starting with heat treated 4" bar stock, three different tapers are turned, with all diameters ground concentric. Ends are hob-threaded, and one end drilled and tapped. Final operation is the cadmium plating of bottom taper.

Mass production of such difficult parts as this is our specialty. Behind it is 40 year's experience in metallurgical engineering, precision grinding and uniform quality control.

For information, send a wire, letter or print. We'd welcome one of your toughest problems.

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Experienced production on: King Pins • Wheel Studs Shackle Bolts • Shackle Pins • Brake Anchor Bolts Countershafts • Idler Shafts • Stub Axle Shafts • Steering Ball Bolts • 5th-Wheel Rocker Shafts • Water Pump Shafts . . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter

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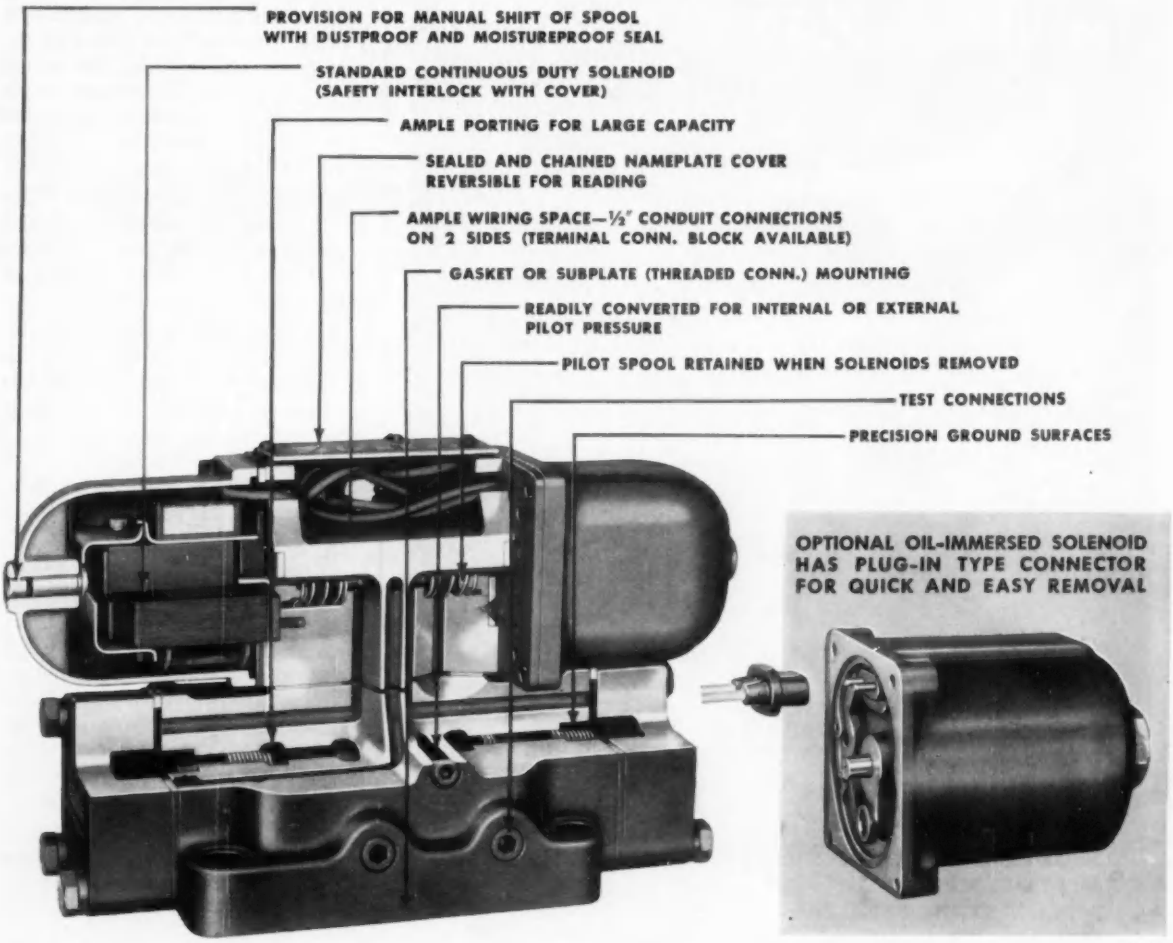
Only VICKERS® DIRECTIONAL VALVES Have *All* These Features


PROVISION FOR MANUAL SHIFT OF SPOOL WITH DUSTPROOF AND MOISTUREPROOF SEAL
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AMPLE PORTING FOR LARGE CAPACITY
SEALED AND CHAINED NAMEPLATE COVER REVERSIBLE FOR READING
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GASKET OR SUBPLATE (THREADED CONN.) MOUNTING
READILY CONVERTED FOR INTERNAL OR EXTERNAL PILOT PRESSURE
PILOT SPOOL RETAINED WHEN SOLENOIDS REMOVED
TEST CONNECTIONS
PRECISION GROUND SURFACES
OPTIONAL OIL-IMMERSED SOLENOID HAS PLUG-IN TYPE CONNECTOR FOR QUICK AND EASY REMOVAL

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REDUCED DOWN-TIME
LONGER SOLENOID LIFE
LESS MAINTENANCE
EASIER INSTALLATION

Vickers hydraulic 2- and 4-way valves provide the optimum in directional control. They are compact, versatile, and are designed for heavy duty, continuous and rapid cycling operation on all types of industrial machinery. More than a decade of application experience and years of research and development back all the valves' features.

Seven spool types satisfy a wide variety of circuit needs and operate at pressures to 3000 psi. Optional oil-immersed solenoids operate cooler, increasing service life 20 to 30 times.

Installation is simplified with ease of wiring and a minimum of piping. The valves are available for gasket or sub-plate mounting. Mounting position is unrestricted except in "no-spring" models. The optional oil-immersed solenoid has a plug-in type connector and is available in all standard voltages. Field modification of existing units can be made to incorporate heavy-duty, oil-immersed solenoids.

The valves conform to JIC Standards and are available in ⅛" and ¼" direct solenoid operated models . . . ¾", 1¼", 2", and 3" solenoid controlled pilot operated models. These valves cover the flow range from 1.25 gpm to 320 gpm.

For further information, write for Installation Drawing I-182412.

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Machinery Hydraulics Division
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**Tape, Pressure-Sensitive, Adhesive, Paper, Water Resistant.*

Cartons full of heavy parts or assemblies stay together when they're sealed with rope-paper backed Shuford's SHURTAPE RP-25.

Use it to seal V-Board and W-Board fibre containers . . . use it on individual parts to protect surfaces . . . or for banding and bundling.

Heavy-duty Shuford's SHURTAPE RP-25 has excellent resistance to water and abrasion, heavy adhesion and clean strip . . . serves many industrial purposes!

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it possible to lift the chassis for tire changing and emergency uses; front and rear stabilizers to provide for lateral firmness.

Looking at the illustrations of the front and rear air springs, it will be noted that the diaphragms are really rolling seals with lips designed to seal against the metal parts. The rear diaphragm has a solid steel outer bead around which are wrapped two plies of nylon cord. A snap-in plug locates the diaphragm in the plunger. The dome of the rear spring is crimped over the ring with the diaphragm in place. Rear spring volume is 235 cu in.

The front spring plunger is designed to serve as an auxiliary reservoir. The upper end of the plunger is clamped to the inner bead ring of the front diaphragm and a hole is provided in both diaphragm and plunger for air flow. The front diaphragm has an inner as well as an outer bead ring.

In operation the normal design pressure within the air springs is 100 psi. Design spring rates are about 60 per cent of present coil springs for about one inch on each side of the normal trim height. A unique feature of the air springs is their variable spring rate which takes effect if the wheel moves beyond the one-inch travel in either direction. This variation in spring rate is accomplished by the shape of the air spring rings and plungers in conjunction with the air volume.

The Air-Poise system requires air under pressure and entails installation of an air compressor, storage tank, and control valves. The system is termed a modified closed system since air discharged from the springs is returned to the compressor by return tubes. Thus air is lost only when the springs discharge while the engine is stopped. The system uses from 300 to 400 cu in. of air per minute, the air inlet being maintained at a constant pressure of 125 psi by a pressure regulator.

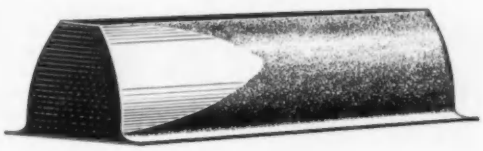
Two height control valves are provided at the rear, one on each side of the rear spring cross member at each air spring. The arms of the valves are connected by links to the rear axle struts. There is a

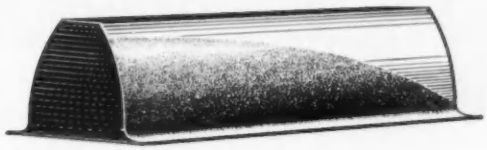
Hard Gear Honing

GIVES YOU BETTER GEARS AT LESS COST

QUICK GEAR INSPECTION

One quick pass with a Red Ring honing tool cleans up the teeth or immediately reveals heat-treat distortions, thus indicating corrective adjustments in the gear forming processes.





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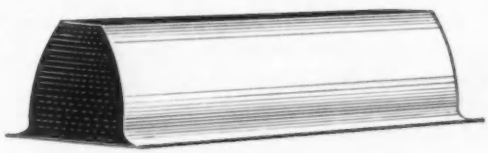
Minor distortions in tooth profile, helix, index and runout are corrected in from 15 to 60 seconds of honing time.



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Gear honing provides:

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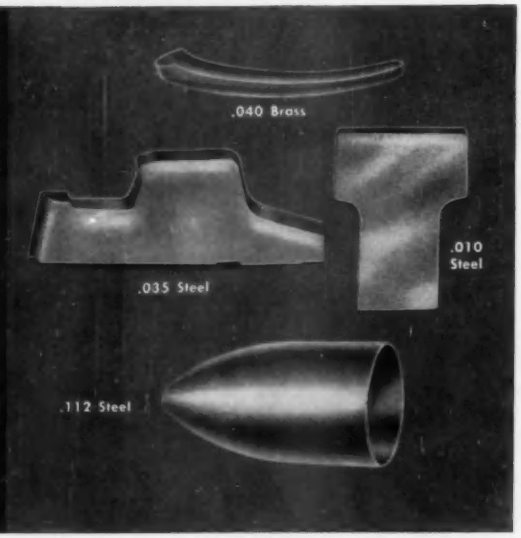

Increase output . . . reduce costs!

Costly, time-consuming trimming and notching operations can be done in one operation with a Brehm Trimming Die. Don't worry about stock thickness. Edges will be of full thickness — clean, flat, without burrs or distortion at the trimmed edge.

Other Brehm Die advantages! **Workable Materials** — gold, silver, stainless or mild steel, copper, brass, refrigerator doors, auto bumperbuf zinc, aluminum, fiber, rubber, plastics, **Quantities vary** — Stove or refrigerator doors, auto bumper buffers or typewriter covers, from 264 to 900 per hour. Intermediate parts, where stock and scrap can be blown from the die, about 1350 per hour. **Shapes** — fountain-pen ferrules, artillery cases, watch cases, burial valuts, automotive, kitchen, radio and television accessories and parts. Almost anything you need trimmed.

A Brehm "Shimmy" Trimming Die with angular cams, cuts four ways in one press stroke, handling straight or curved edge contours, with multiple notches and projections. Slow, costly "horn" and "pinch" trimming operations, are eliminated.

Send part prints for quotation on Brehm "Shimmy" and related dies, such as blank, form, pierce.

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VULCAN tools

single height control valve at the front, located inside the front cross member, with a link connecting to a lever clamped to the front stabilizer.

To improve cornering stability, a check valve is supplied between the springs and the height valve, permitting rapid fill while at the same time restricting flow out of each front spring by means of a metering orifice. A small amount of valve dwell is provided to prevent opening and closing of the height valve when a wheel strikes a bump.

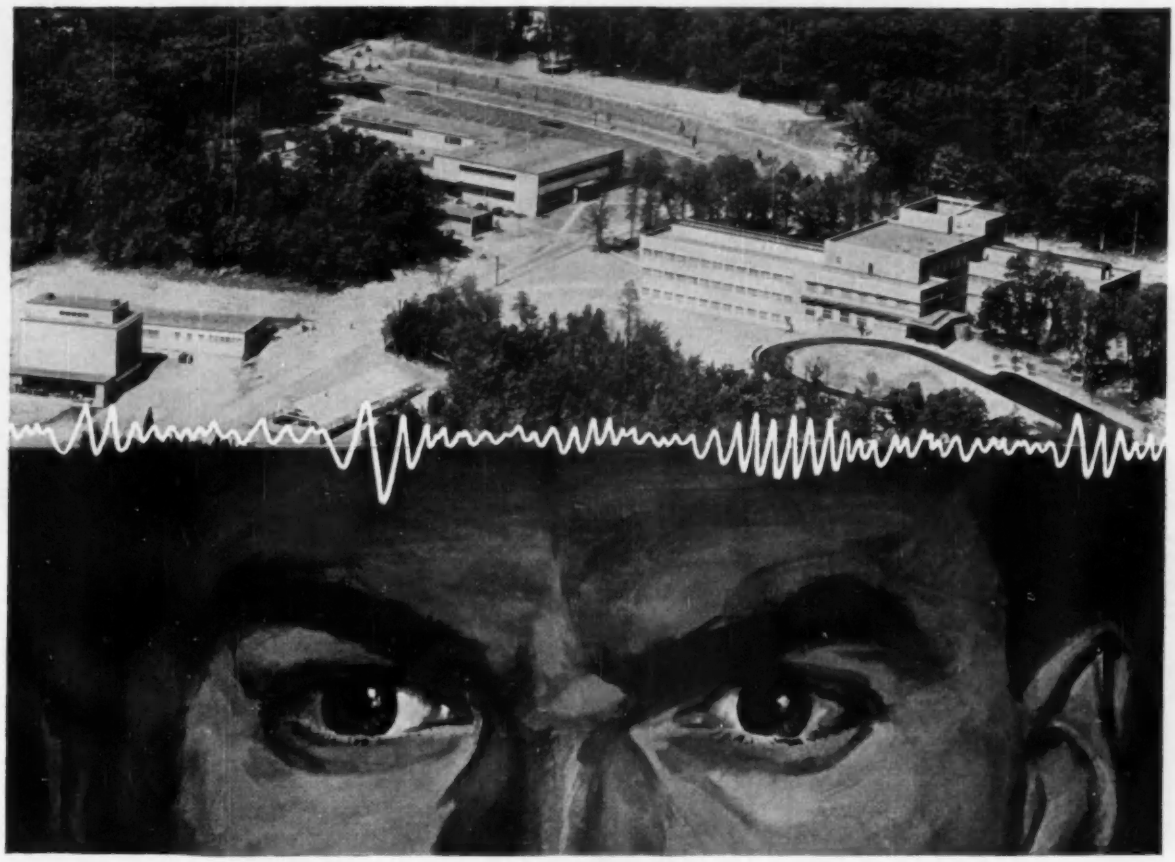
An important feature is the low pressure control valve. The Air-Poise system is designed to level the car automatically, but when the car is rounding a curve or accelerating or decelerating the plane of the car is disturbed from a level position by the dynamic forces that come into play. Unless additional control is provided, such dynamic disturbances could result in excessive valve dumping. The low pressure valve serves to provide two different discharge rates, depending upon the actual pressure in the spring. If the air pressure is above normal, a rapid discharge rate is permitted, allowing for quick trim compensation. If the spring pressure is equal to or less than normal pressure of the rear spring at regular trim, only a slow discharge rate is permitted.

The travel of air in the system is as follows: from the high pressure tank air moves to the lift valve where pressure is regulated to 125-psi. From this point air moves as needed to the height control valves. Normal air flow from the height valves returns to fittings at the lift valve. Before the air can move to the compressor inlet it must pass through the low pressure control valve. The return air then moves to a tee at the compressor.

• • •

Firestone Noblesville Plant Building 15 Bellows Types

Firestone Tire & Rubber Co. is building some 15 different types of bellows for air suspension systems to meet varying requirements of 1958 passenger cars. The firm's recently completed plant at Noblesville, Ind. is devoted exclusively to air suspension production. Firestone engineers claim life of two million miles for their rubber-nylon bellows.



Here, creative minds will shape the future

Yes, here in the new Research Center of United States Rubber Company the probing minds of chemists and other scientists will find the ideal environment for conceiving new ideas...the finest facilities for bringing them into reality. Located on a 100-acre tract in suburban Wayne Township, New Jersey, the Center is a concrete symbol of the basic importance of Research in this company's past, present and future.

Significantly, at least 25 of U. S. Rubber's major product lines have been developed within the past twelve years.

As the Chemical Division of U.S. Rubber, Naugatuck Chemical continues to contribute a generous portion of new and improved products... such as its compounding method for greatly increasing the ozone resistance of its Paracril® nitrile rubbers.

Such developments stem not only from our research laboratories at Naugatuck, but also from Naugatuck's agricultural research facilities at Bethany, Connecticut, and the laboratories of our Canadian affiliates, Naugatuck Chemicals and Dominion Rubber Company, Ltd. Now, Naugatuck's research will be substantially augmented—and perhaps channeled in radically new directions—by the more fundamental research carried on at the new Research Center.

In the future, even more than in the past, look for the name Naugatuck to identify *the newest and the finest* products in their respective fields!

Naugatuck Chemical

Division of United States Rubber Company, Naugatuck, Connecticut

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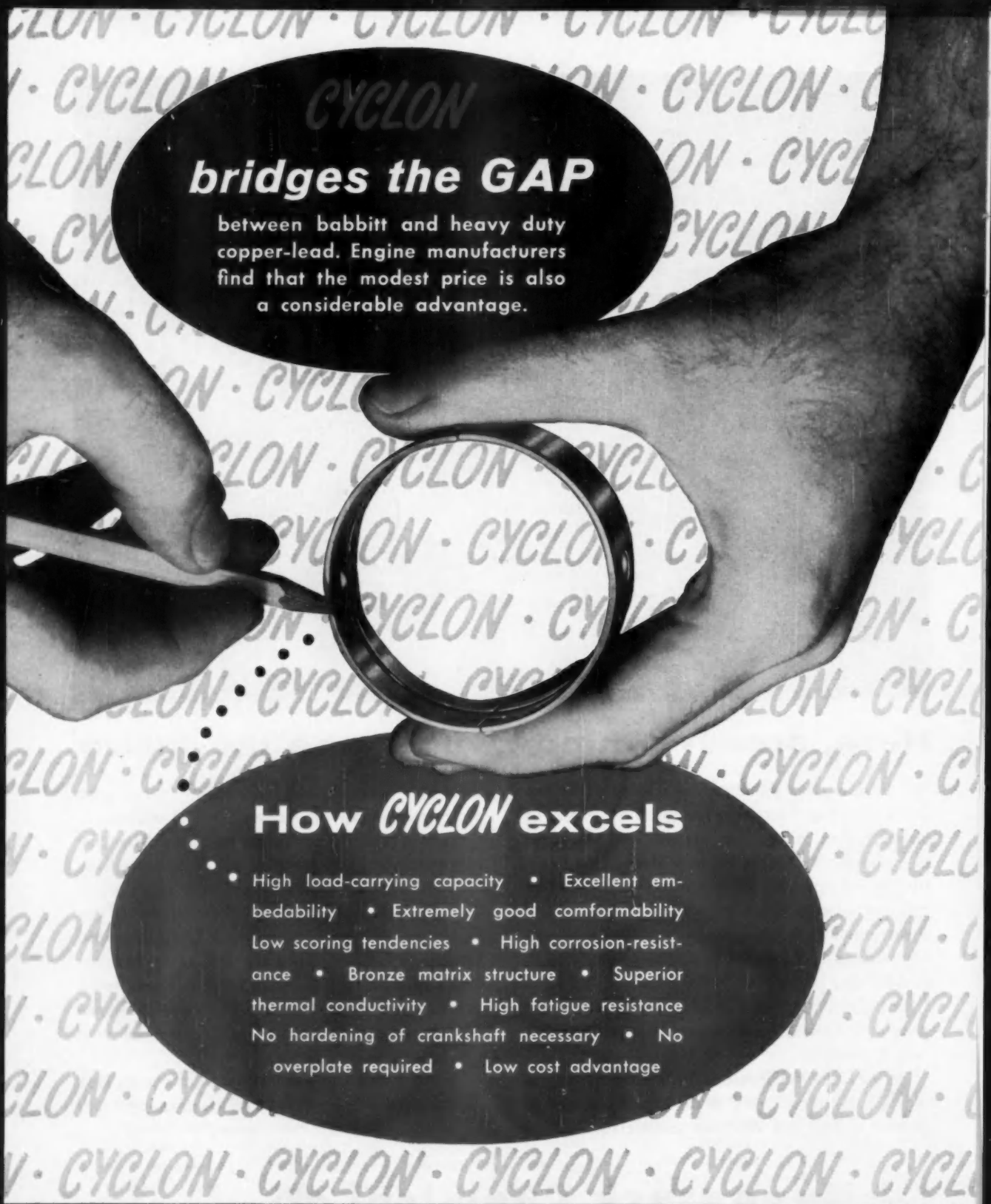
bridges the GAP
between babbitt and heavy duty copper-lead. Engine manufacturers find that the modest price is also a considerable advantage.
How CYCLON excels
• High load-carrying capacity • Excellent embedability • Extremely good comformability Low scoring tendencies • High corrosion-resistance • Bronze matrix structure • Superior thermal conductivity • High fatigue resistance No hardening of crankshaft necessary • No overplate required • Low cost advantage

DETROIT ALUMINUM & BRASS CORPORATION

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MANUFACTURERS OF ORIGINAL EQUIPMENT SINCE 1925

Westinghouse Conference

(*Continued from page* 114)

from there to a pull-out conveyor, transported to a turn-around device, turned 90 deg, deposited on another pull-out conveyor, and finally deposited on a main floor conveyor. In doing this it is necessary for two different sets of controls to remember what has been put on the storage lines and what has been removed, as well as to give directions for the entire series of operations. In meeting this problem, Westinghouse's approach was the application of Cypak static control equipment.

Conveyor Control

G. E. Mathias, Systems Control Department, Westinghouse Electric Corp., Buffalo, N. Y., followed Mr. Shepherd on the program to explain the detailed functions of the control equipment. In his preliminary remarks he reiterated that the Delaware assembly plant had been engineered to reduce manual material handling to the minimum. Floor conveyors and overhead conveyors are electrically synchronized to travel in unison. Transfer of body dollies from one conveyor to another is entirely automatic. And even the transfer of body dollies from the normal assembly line to inspection and repair lines requires no manual assistance once an attendant presses a pushbutton.

Regulation of the operation of each conveyor is by electrical control systems designed and built by Westinghouse. At the center of the electrical intelligence system synchronizing each conveyor with its lead conveyor is a Magamp magnetic amplifier (a static non-electronic unit) designed to regulate conveyor speed and position. Each conveyor drives a polyphase synchro-tie transmitter which transmits a position signal to the Magamp. At the Magamp control the first signal is compared with a similar electrical position signal generated by a master synchro-tie driven by a second conveyor or by a zone master rate synchronous drive.

Each conveyor is driven by one, two or three d-c motors all powered

IBM relies on **RANSBURG NO. 2 PROCESS Electrostatic Spray Painting** to get the excellent and uniform high quality wrinkle finish on all **IBM ELECTRIC TYPEWRITERS**

Both prime and finish coats are uniformly applied to IBM Electric Typewriter cases as they rotate around the floor-mounted Ransburg No. 2 Process reciprocating disks. Automatic Electro-Spray provides three times as many pieces per gallon as by former hand spray.

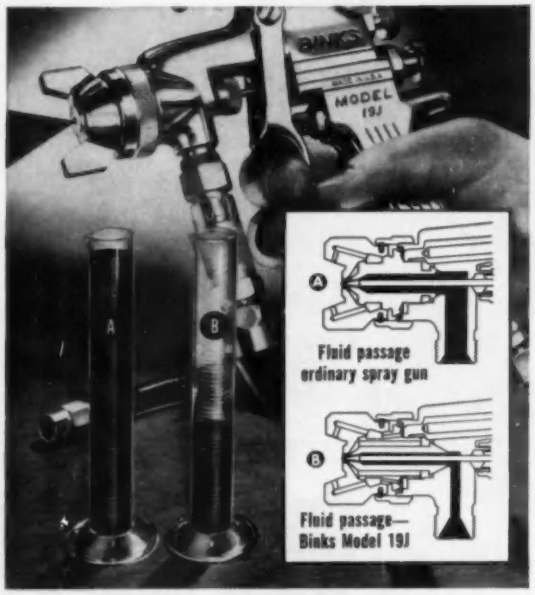
IBM's strict quality standards are easily maintained with Ransburg No. 2 Process in the painting of Electric Typewriter parts. Rejects by the former hand spray method used to run as high as 30% on some parts. Now, with automatic Electro-Spray, rejects for all reasons are only 3% to 5%.

Three Times as Many Pieces per Gallon!

Along with increased production, paint mileage is stepped up, and they get three times as many pieces per gallon as by the former hand spray method. That's because efficiency of the Ransburg No. 2 Process Reciprocating Disk puts the paint where it's supposed to go . . . on the parts.

Want to know how Ransburg Electro-Spray can improve the quality of your painted products . . . and at the same time, cut your paint and labor costs? At no obligation to you, we will make complete laboratory tests with your products to prove the advantages and cost saving benefits which can be yours with Ransburg No. 2 Process. Write or call.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG



65% savings in paint!

Ⓐ To clean-out a conventional spray gun after transferring to another paint line, 7 to 10 ounces of paint must be "bled" to prevent a color inter-mix.

Ⓑ Only 2 to 4 ounces of "bleed-out" paint are required to clean-out the new Binks Model 19J spray gun —a 65% material savings.

New Binks spray gun for circulating systems

Cuts clean-out costs 65% when changing colors

Plants using multiple-color paint circulating systems frequently shift spray guns from one color line to another. To clean the old color out of the spray gun the new color must be run through the gun (and quick detachable hose connection) until there is no danger of inter-mix. Paint lost through this "bleeding" operation runs between 7 and 10 fluid ounces.

New spray gun cuts "bleed" losses almost 65%. Binks Model 19J spray gun, when used with the same quick detachable hose connection, slashes "bleed-off" losses. Only 2 to 4 fluid ounces must be passed through the passages to make certain there is no inter-mix to cause a finish reject.

Unique design features. Binks Model 19J is an efficient, dependable production spray gun in every respect. Its paint saving characteristics are achieved through two unique internal design features. Design feature number one greatly reduces the amount of paint contained between material inlet and nozzle orifice over that contained in conventional spray guns. Feature number two eliminates all "pockets" in the gun head which can trap paint. This also contributes to faster cleanout with less waste.

Automatic model available. Binks Model 21J is an automatic spray gun, triggered by air pressure. On automatic painting machines it provides the same paint saving economies as the Model 19J.

All the facts in Bulletin RFG. Get the complete story on these two new Binks spray guns. Ask your Binks industrial distributor for a copy or write direct to the address below.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases.

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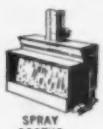
Binks
EVERYTHING FOR
SPRAY PAINTING

SPRAY GUNS


SPRAY BOOTHS

NATIONWIDE SERVICE

Binks Manufacturing Company
2120-30 Carroll Ave. West, Chicago 12, Ill.

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from one adjustable-voltage motor-generator set. A Magamp regulator supplies the generator excitation. As the speed of the drive approaches the desired speed, the position regulator corrects the decreasing position error. For this reason and for reasons of flexibility, the Magamp regulators on these conveyor drives have counter-emf speed feedback signal as well as position.

The polyphase synchro-tie transmitter driven by each conveyor is geared so that one revolution of the synchro-tie is equivalent to one job length on the conveyor. For this application, synchro-ties are two-pole machines. By gearing the polyphase synchro-ties in this fashion the possibility of false synchronizing location is prevented. There is only one correct position and the regulating system directs the drive to that position by the shortest route.

Primaries of the synchro-ties are excited from a common three-phase power supply. A voltage is induced in the secondary winding by the rotating magnetic field established by the primary winding. The phase relation between primary and secondary voltages depends upon the

(*Turn to page* 134, *please*)

Business Opportunities

TIRES—NEW & RECAP PLANT—CEN. GA. Price $75,000 incl inv eqpmt & franchise. Gross sales $164,390 yr. Xlnt oppty. Free & clear. Brochure on req. Ref. B-9381.

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CAR WASH & GAS STA. CENTR. ILL. Price $40,000. 3/m wash lines up 22 cars. 4 pumps—gross sales $127,000. Xlnt. loc. —Free & clear. Detl. on req. Ref. B-62288.

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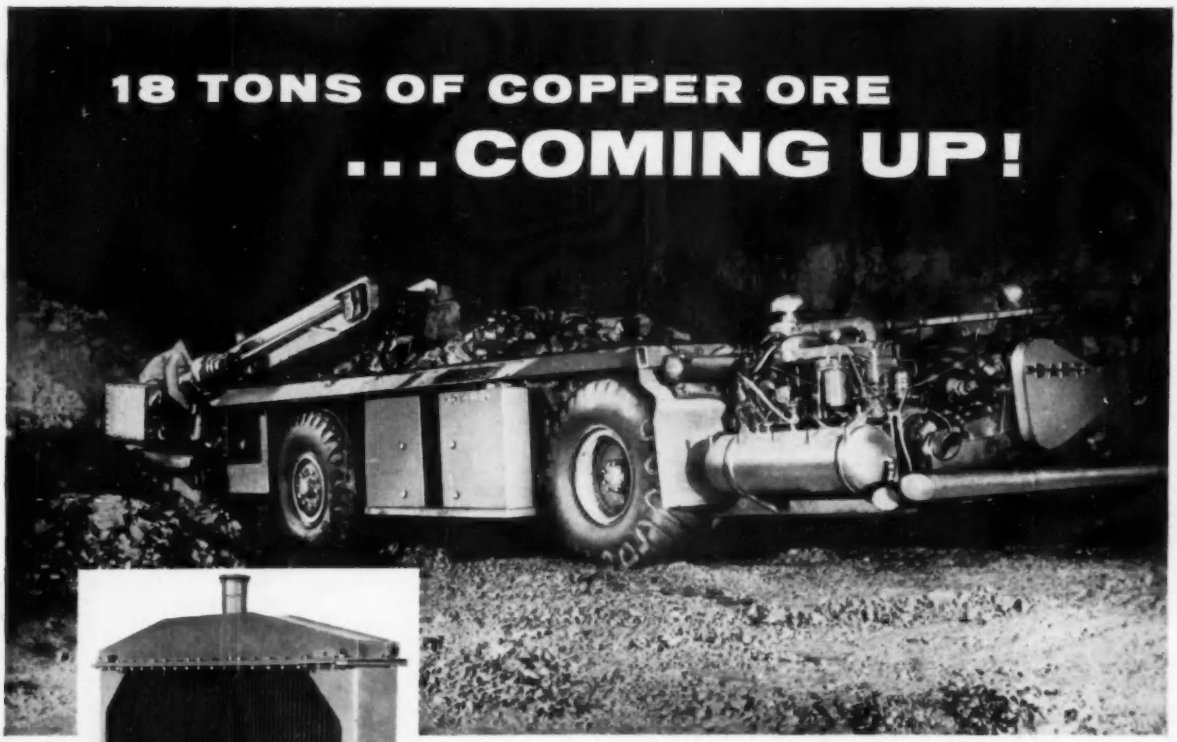

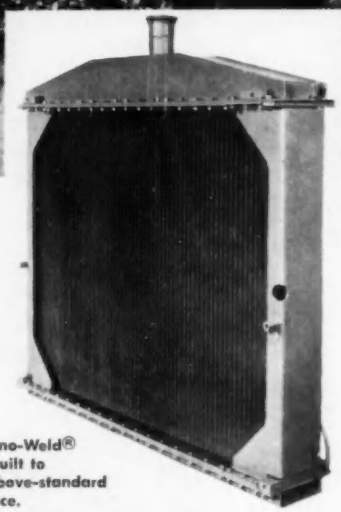

Young Mono-Weld® radiator built to provide above-standard performance.

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"Used where the going is tough!" No idle phrase when used about Young radiators—proved again and again to withstand the rough, tough, rigorous conditions typical of the mining operation illustrated above.

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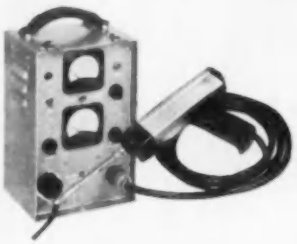
Creative HEAT TRANSFER ENGINEERS

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

HALOGEN LEAK DETECTOR



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STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF AUTOMOTIVE INDUSTRIES, published semimonthly at Philadelphia 39, Pa., for October 1, 1957.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, John C. Hildreth, Jr., 301 Pugh Road, Devon, Pa. Editor, James R. Custer, 303 Hampden Road, Upper Darby, Pa. Managing editor Harry Roberts, 110 Cornell Avenue, Swarthmore, Pa. Business manager, John C. Hildreth, Jr., 301 Pugh Road, Devon, Pa.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.

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3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

JAMES R. CUSTER
Editor

Sworn to and subscribed before me this 24th day of September, 1957.

PHILIP J. SHIRE, JR.
(My commission expires January 7, 1959)
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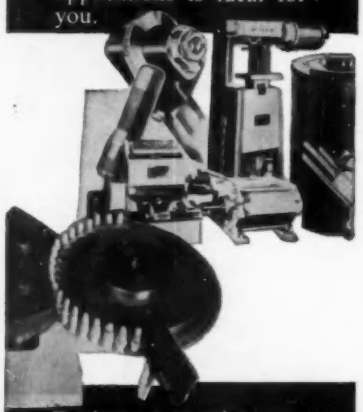

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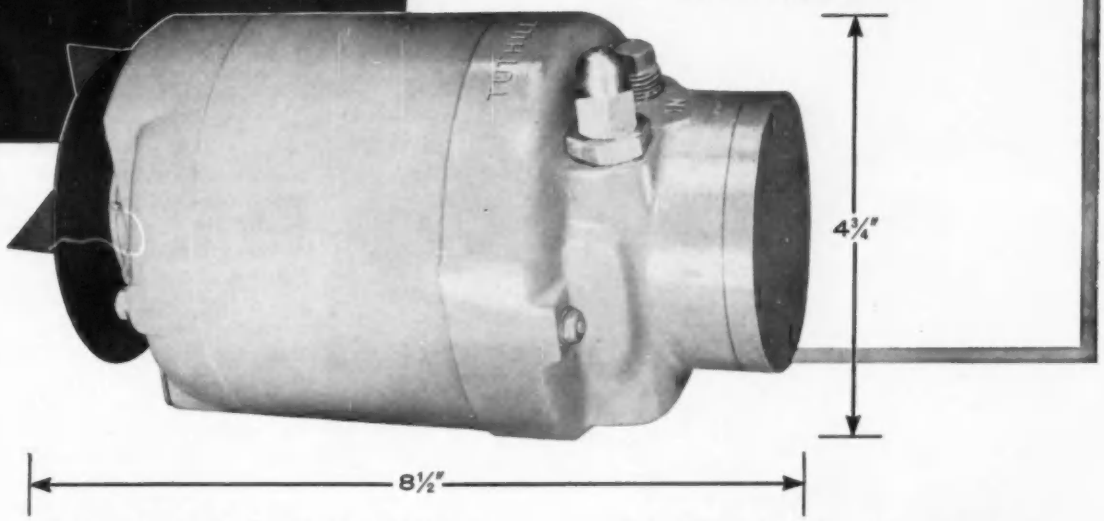

Here's another example of Tuthill's ability to develop the pump to fit the problem. This compact, new Powermite motor-pump combination, a Tuthill exclusive, was developed to meet the requirements of original equipment manufacturers with unusual space and weight limitations.

Motor and cooling blower have, in effect, been incorporated into the internal gear positive displacement rotary pump. The whole unit takes up no more space than a standard electric motor. A single shaft serves all units of the Powermite—and the elimination of couplings, other parts and labor permit substantial economies for OEM applications.

The pump section contains a built-in strainer, and, if desired, an adjustable relief valve. Powermite can be furnished with cooling blower, as illustrated, or it may be supplied with a shaft extension for driving other accessories.

Powermite can be furnished in a wide variety of pump and motor combinations for use in hydraulic, oil burning, lubricating, and other services involving many different fluids. For example, the model illustrated has a capacity of 18 gallons per hour at 300 psi, and is driven by a 1/12 hp motor at a speed of 1750 rpm.

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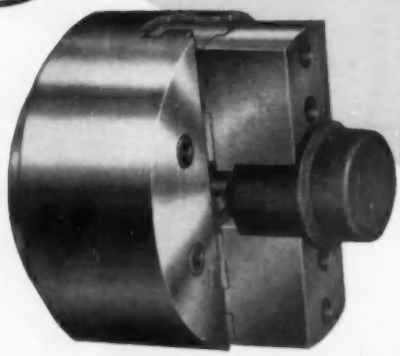

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Westinghouse Conference

(*Continued from page* 130)

rotor position of the synchro-tie. Vectorial relationship of the primary and secondary phase voltages of the master (reference) synchro-tie transmitter and the conveyor (actual position) synchro-tie governs the control operation.

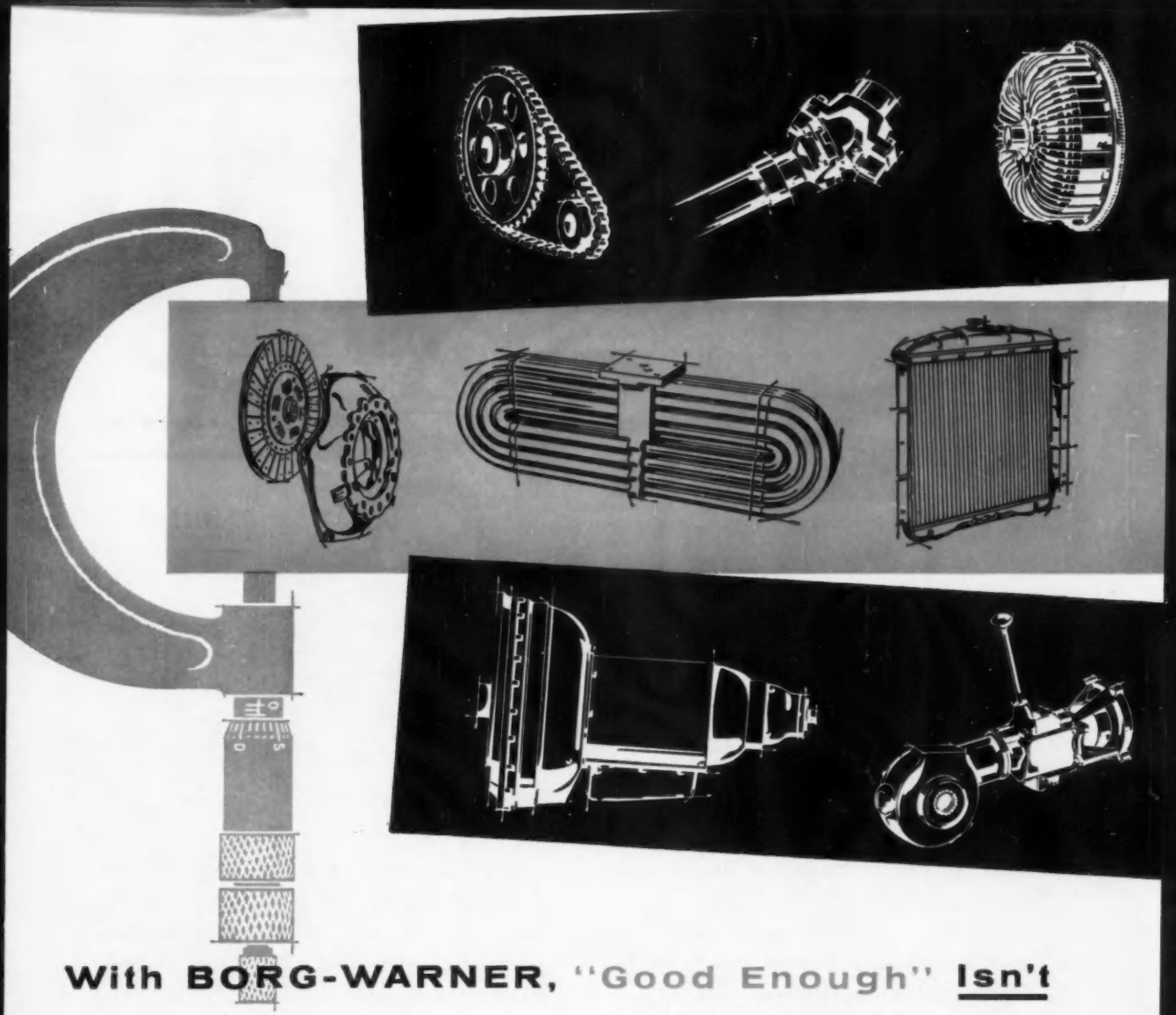
Vector addition is used to create an electrical signal which indicates the relative position of the conveyor with respect to the reference position. Eight pairs of selected voltage vectors are added separately. Each of the four resultant vectors is then converted by rectifiers to four d-c voltages whose magnitudes are proportional to the magnitudes of the vector voltages. Two of the d-c voltage signals increase in magnitude if the conveyor position is behind, and the other two decrease. If the conveyor is ahead of reference position, the d-c voltages change in the opposite manner. Consequently, comparison of magnitude of resultant vectorial phase voltages produces a difference or error signal of voltages from the synchro-ties. The magnitude of the error signal is a measure of the degree of actual position error; its polarity is an indication of the actual error.

Cascade-type electrical interlocking is used wherever a series of conveyors are running together. Any normal or trouble stop on one conveyor will stop the conveyor feeding onto it, which in turn stops the next conveyor in line. Thus, no pile-up will occur if a conveyor attempts to feed a dead conveyor. After the first conveyor is restarted, the second conveyor will automatically re-start, followed by the third and all others. Responsibility for starting and stopping conveyors is therefore removed from the operator and transferred to the electrical equipment.

Storage Conveyors

Conveyors in storage areas are isolated from direct synchronization with production line conveyors. Routing and scheduling in the storage lines are simplified by the use of Cypak logic elements. The Cypak control directs the proper

(*Turn to page* 139, *please*)



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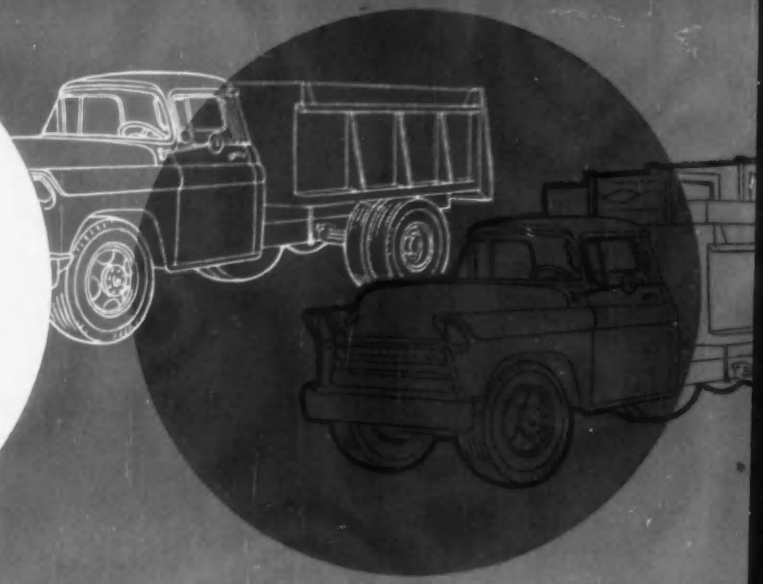

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LONG MANUFACTURING CO., LTD. (Canada)—clutches and radiators for passenger cars, trucks, buses and tractors; oil coolers for the automotive industry.

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ROCKFORD CLUTCH—spring-loaded and over-center clutches for automobiles, trucks, tractors, road-building, earth-moving and oil field machinery, industrial machinery, agricultural implements, machine tools (Pullmore). Power take-off and gear reduction units for gasoline and diesel engines.

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Westinghouse Conference

(*Continued from page* 134)

indexing of transfer, quick-loader, and storage conveyors.

Moduline Gear Drives

A new line of gear drives, using completely interchangeable modular components for adaptability to a large variety of power transmission applications, was introduced by Westinghouse at the meeting. Named Moduline, it was described by A. S. Davis, Gearing Div., Westinghouse Electric Corp. Using the same basic components, seven new frame sizes replace over 20 conventional gearmotors, eight speed reducers, and many smaller specialized gear drive lines offered by Westinghouse in the past.

Two other members of the Moduline family are single and double-reduction shaft-mounted speed reducers. With the exception of hollow-shaft units, they use the same low-speed gears and cages as do the other reducers.

In closing, the author stated that since gear units are rated in lb-in. of torque, it is difficult to establish firm limits of horsepower capacity. Although some ratings are as low as 1/10-hp, others as high as 137 hp, he expressed the real applications for Moduline as being in the 1 to 30-hp range, which covers a surveyed 85 per cent of materials handling requirements.

AUTOMOTIVE INDUSTRIES . . .

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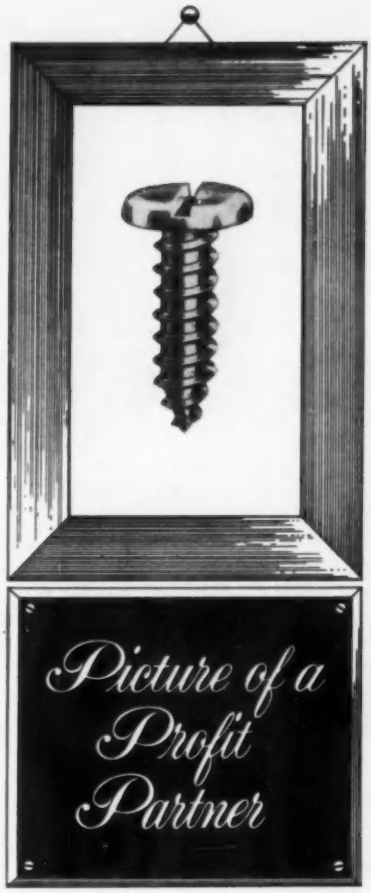
MANUFACTURING

• • •

ASTE Tool Show Sold Out; 462 Exhibitors Are Listed

The American Society of Tool Engineers 1958 Tool Show (May 1-8) has signed 462 exhibitors, selling all available exhibit space at Philadelphia's Convention Center. The Tool Show will be held in conjunction with ASTE's 26th annual meeting and convention.



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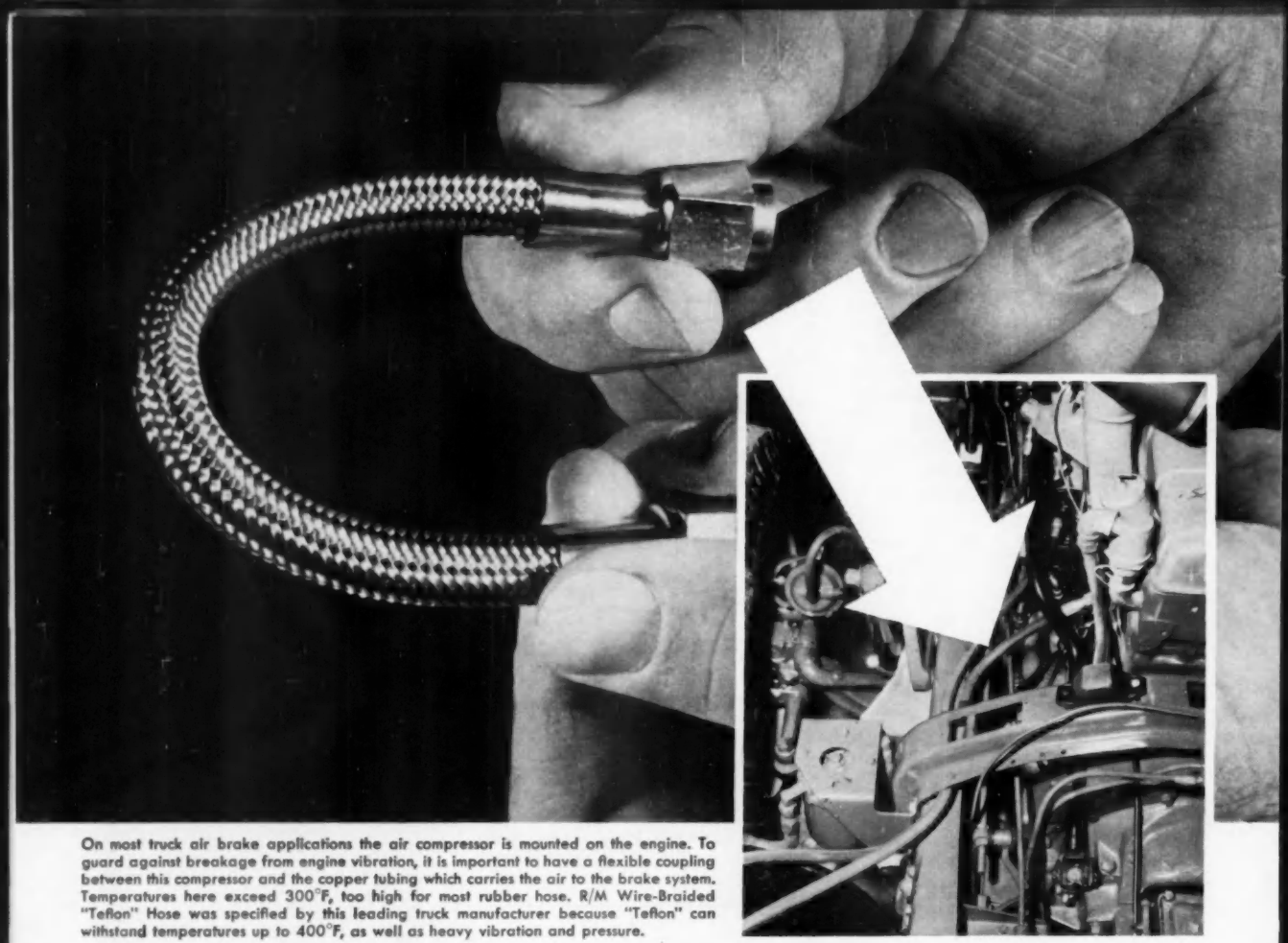

On most truck air brake applications the air compressor is mounted on the engine. To guard against breakage from engine vibration, it is important to have a flexible coupling between this compressor and the copper tubing which carries the air to the brake system. Temperatures here exceed 300°F, too high for most rubber hose. R/M Wire-Braided "Teflon" Hose was specified by this leading truck manufacturer because "Teflon" can withstand temperatures up to 400°F, as well as heavy vibration and pressure.

To withstand heat, vibration, pressure and corrosive chemicals . . . R/M "TEFLON"* HOSE

Where heat, pressure, vibration or corrosive fluids are factors, R/M Thin-Wall Flexible "Teflon" Hose may well be the most economical, as well as the most effective, solution to your problem.

R/M "Teflon" has unique chemical, electrical and physical properties. It can be kept in continuous service at temperatures from — 100° to 400°F. It is impervious to chemical attack. It is highly flexible. It does not expand, contract or fatigue. And it has an extremely low coefficient of friction—reducing pressure drop in fluid systems to the minimum.

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R/M Thin-Wall Flexible "Teflon" Hose is made in a wide range of inside diameters and wall thicknesses—available either with stainless steel wire-braided jacket or rubber covered. Other R/M "Teflon" products include rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded rods and tubes; and custom-machined parts. Raylon—R/M trade name for mechanical grade "Teflon"—has many characteristics of virgin "Teflon."

If you would like further information on R/M "Teflon" and what it could do for you, remember that R/M is as near as your telephone.

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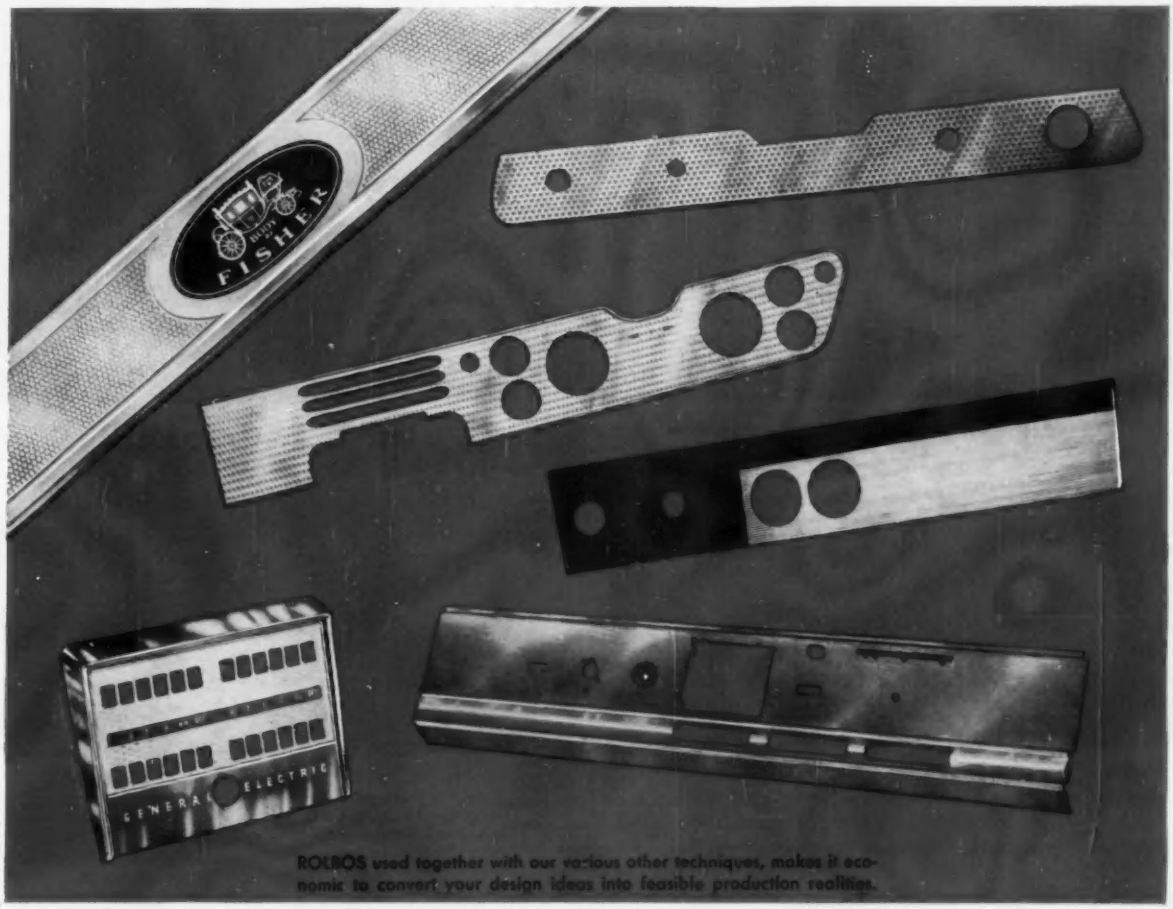

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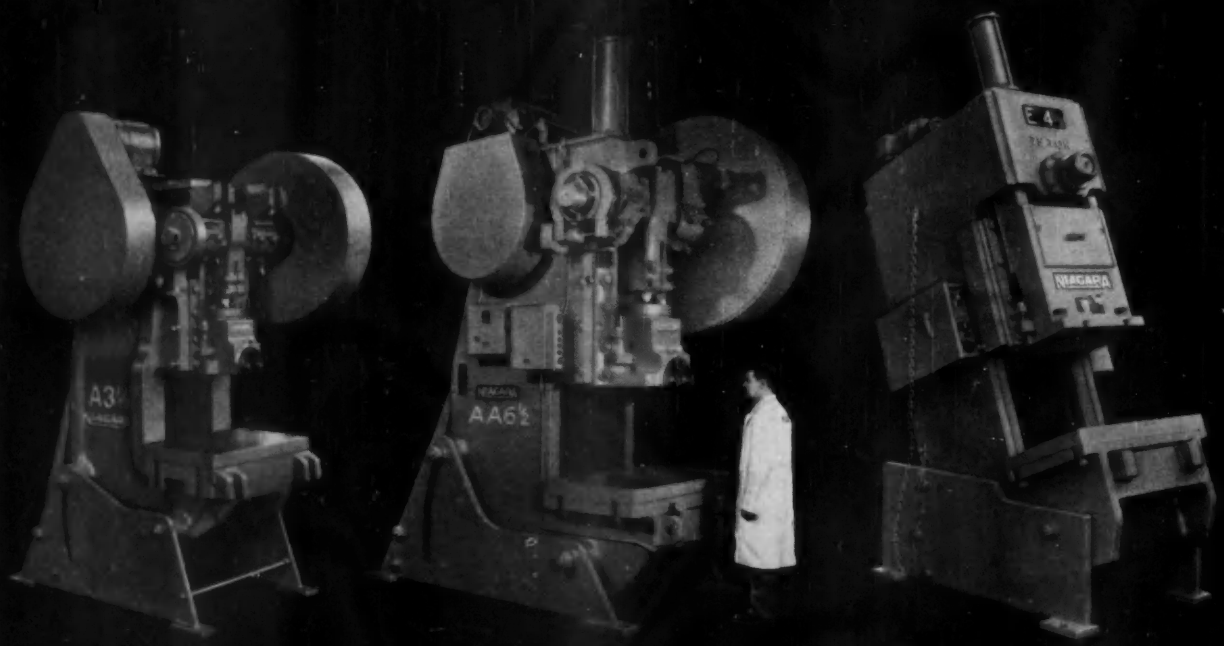

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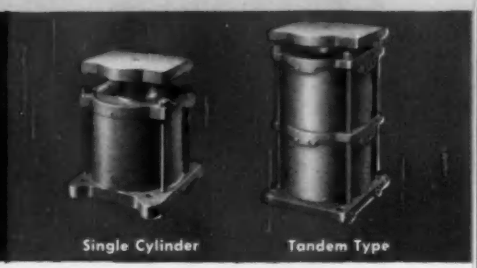

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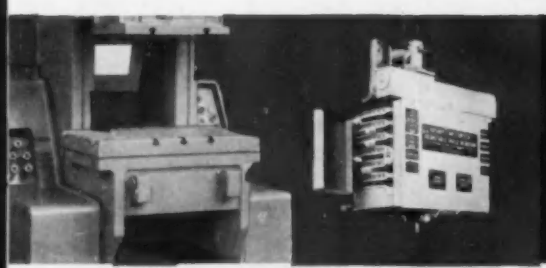
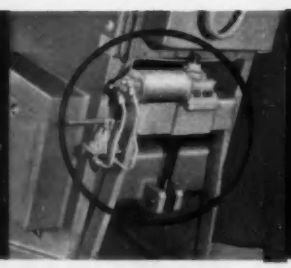
Each Niagara Inclinable features the clutch best suited for the purpose. (1) Famed Niagara multi-jaw mechanical sleeve clutch. (2) Exclusive Niagara multi-jaw Electro-Pneumatic sleeve clutch. (3) Niagara low inertia Electro-Pneumatic friction clutch.

FOUR TYPES OF DIE CUSHIONS

Designed and manufactured by Niagara, single cylinder and tandem type pneumatic die cushions are built in 4 types to make any Niagara Inclinable a double action press. Self-lubricating models are available for automated OBI's.





SPECIAL BOLSTER PLATES
J.I.C. CONTROLS FLANGED SLIDES
POWER SLIDE ADJUSTMENT
FLYWHEEL BRAKE
DIE AREA LIGHTING
MOTOR CUTOUT SWITCH

EQUIPPED FOR AUTOMATION

Featuring the most advanced controls and devices, Series EA (automated models) are engineered for peak productive capacity. Here's a line of OBI's that is completely equipped by Niagara for operation in your automation lines.

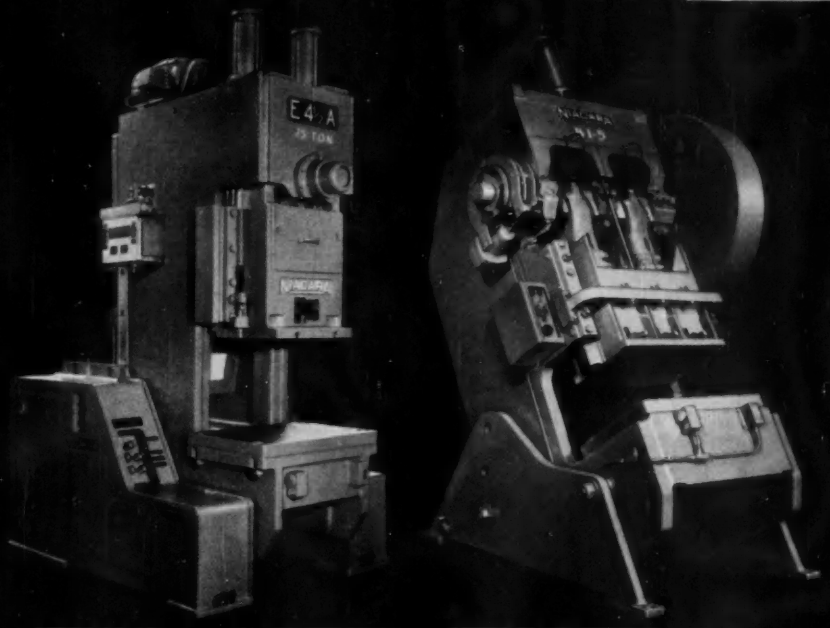
POWER INCLINING DEVICE

Fast-acting, safe and easy to operate, Niagara's air motor inclining device (shown above) is furnished as an optional accessory.

WIDE CHOICE OF ACCESSORIES

With a full selection of modern press accessories available, Niagara Standard Inclinables are adaptable to the widest possible range of job assignments.

standard OBI presses in all sizes and types that are right for you!



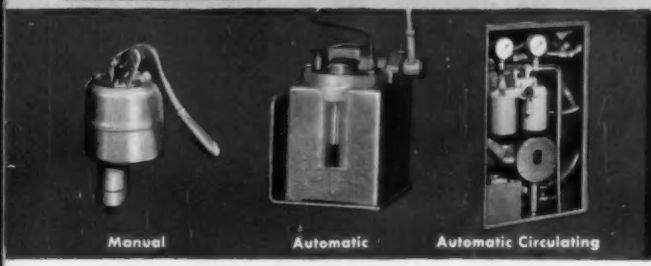
SERIES EA (Automated), 75-200 tons
Front-to-Back Crankshaft

SERIES BI, 60-200 tons
Double Crank

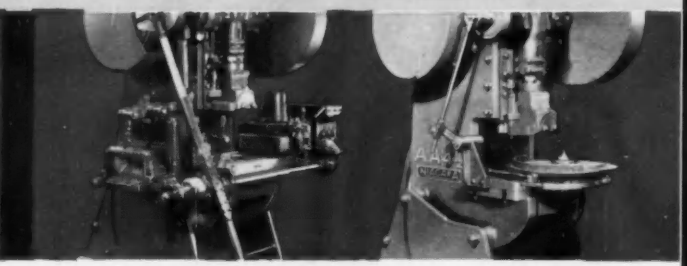
5 LINES . . . 34 MODELS
EACH A CHAMPION IN ITS CLASS

Niagara offers you industry's most complete, most modern, and *most exclusive* selection of standard inclinables . . . *plus* an unequaled choice of press accessories and automatic devices to meet your specific job requirements. You can count on Niagara for inclinables that will do the most to speed production, assure accuracy, prolong die life and hold down maintenance costs within your plant.

YOUR WORK MOST PROFITABLY



Manual Automatic Automatic Circulating



CENTRALIZED LUBRICATION TO FIT THE NEED

Niagara Inclinables are readily equipped with either manually-operated or automatic lubricators, or automatic circulating oil systems. It's one of the many ways in which Niagara outfits standard inclinables to meet individualized requirements.

ALL TYPES OF AUTOMATIC FEEDS

To speed production, Niagara Inclinables are easily equipped with complete, automatic feed arrangements: single roll, double roll, dial, chute, magazine and specially engineered types. Variable speed drives can be provided to allow adjustment for the optimum speed consistent with the die, material and feed length.

NIAGARA

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

GET ALL OF THE FACTS on any or all Niagara Inclinable Presses. Consult with a Niagara representative. His recommendation will be impartial. He has all types of OBI's to offer. At your request, specific Bulletins on each series, containing complete information and specifications, will be mailed to you promptly

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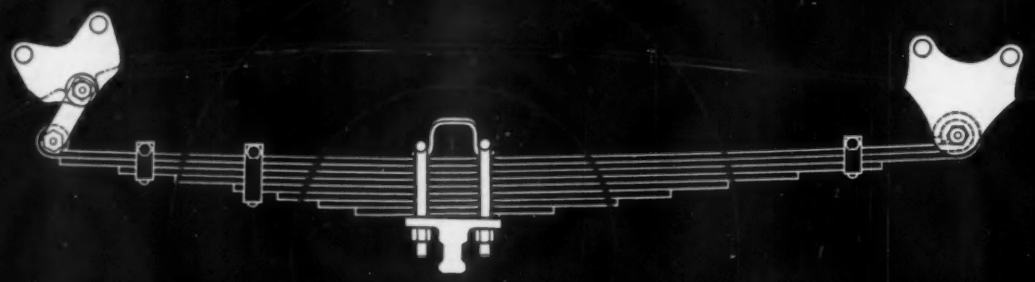
CRADLE-SAFETY . . .



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SPRINGS

since 1904—original equipment on cars, trucks, cabs, buses, trailers

Three-point suspension at shackle, hanger, and axle provides "CRADLE-SAFETY," functional for the life of the springs.

This suspension provides perfect balance, alignment, and sidesway control . . . safety factors performed naturally and efficiently by leaf springs — *well designed.*

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AUTOMOTIVE ENGINEERING NEWS

LATEST PROPERTY AND APPLICATION DATA ON

ZYTEL® nylon resin

Now—versatile Du Pont ZYTEL® nylon resin used in a wide variety of improved auto parts

The use of Du Pont ZYTEL for structural and mechanical parts is constantly expanding. The moldability of ZYTEL makes it a natural for use where millions of units are required. Its high strength in combination with other high-grade properties is especially valuable in the automotive industry.

As an example, ZYTEL offers a combination of toughness, abrasion resistance and hardness for making automotive gears. Another important asset of ZYTEL as a gear material is its resilience. This is the ability of the material to yield under pressure and return to its original state when pressure is released. This property plus its low coefficient of friction permits ZYTEL to outperform steel at ordinary temperatures. Tooth errors which are usually destructive, such as pitch variations, profile error and excessive runout, are minimized at the instant of engagement.

ZYTEL nylon resin is extremely wear-resistant. Both gears and sleeve bearings of ZYTEL tested in the presence of abrasive materials such as sand have outworn metal components by far. Parts of ZYTEL require little or no lubrication.

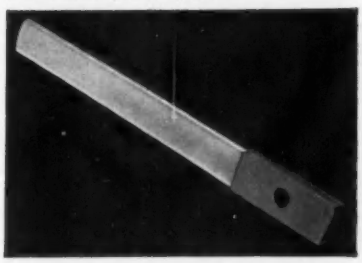
A valuable characteristic of ZYTEL is its resistance to petroleum lubricants. It will not swell or deteriorate in contact with oils, greases, hydraulic fluids or gasoline. Designers can specify lubricated gears, bearings and bushings of ZYTEL without fear of failure.

Frequently, a single part of ZYTEL can replace a number of metal parts, thus eliminating machining and assembly operations. For example, a single speedometer part includes a worm gear, pinion and four different shaft diameters, all molded in one. The economy of such parts is obvious.

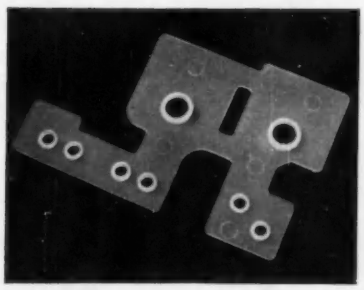
Parts of ZYTEL can be molded directly onto metal pieces. A combination often used is a gear of ZYTEL with an imbedded metal shaft. ZYTEL is rated for intermittent operation up to 250°F. For continuous operation at such elevated temperature, heat-stabilized grades are available. For decorative uses, it is available in rich, deep colors, including metallics.

It may well be possible to make your sub-assemblies better at lower cost by using durable parts of Du Pont ZYTEL—as you will be able to judge if you send for the informative material we have made available. Get the facts by using the coupon below.

Eight of these large main hangar bushings made of ZYTEL are used per trailer; sixteen of the smaller shackle bushings go into the trailer's torsion-bar suspension system.

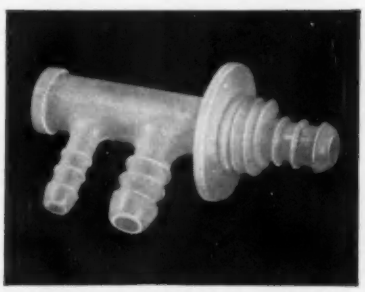


Anti-rattle plate is extruded from ZYTEL 42. Thin, uniform sections of ZYTEL nylon resin absorb shock and vibration without damage. (Extruded by Anchor Plastics Co., Inc., Long Island, N. Y.)

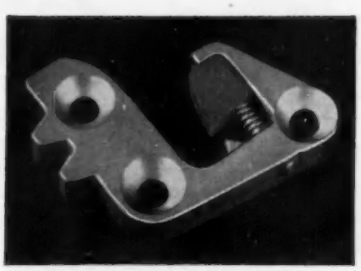


Voltage-regulator base made of ZYTEL provides good electrical insulation . . . is highly resistant to cracking under mechanical stresses.

Thin sections of ZYTEL are translucent, yet strong and flexible. This lens is heat-resistant. Molded projections simplify attachment.



Smooth, accurate moldings such as this windshield washer T-connection reduce cost of subassemblies. Note integral mounting threads.



Hard, smooth door-lock wedge of ZYTEL needs no oiling. Spring-loaded, it operates efficiently due to low inertia . . . resists shocks.

SEND FOR INFORMATION

For additional property and application data on Du Pont ZYTEL nylon resin, clip and mail this coupon.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept.
Room 411, Du Pont Building, Wilmington 98, Delaware

Please send me more information on Du Pont ZYTEL nylon resin.
I am interested in evaluating this material for_____

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Company_____ Position_____

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IN CANADA: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec

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Windshield weatherstrips, convertible tops, axle bumpers, radiator hoses . . . in more than 100 places on today's new cars, Enjay Butyl out-performs and out-lasts *all other* types of rubber formerly used, synthetic *or* natural. *Low-in-cost* and *immediately available* in regular and non-staining grades for white and colored parts, this truly wonder rubber may well be able to cut costs and improve performance in still more automotive parts. For further information, and for expert technical assistance, contact the Enjay Company.

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Enjay Butyl is the greatest rubber value in the world . . . the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

Remove more metal faster with powerful Thor air grinders

Thor has introduced 15 new air grinders in the past year, rounding out the industry's most complete line of air grinders—in a wide range of sizes, speeds and wheel capacities. Ask your Thor factory representative for a demonstration. Thor Power Tool Company, Prudential Plaza, Chicago 1, Illinois.

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GREENLEE TRANSFER MACHINES

Change with Your Requirements

THIS MACHINE HAS BEEN REWORKED FOUR TIMES

The "building block" idea of machine tool design has gained much popularity in recent years. Greenlee has long built such flexibility into their transfer machines. For example, the machine shown here has been modified 4 times in 11 years to accommodate changes in product design. Protect yourself from costly obsolescence. Ask Greenlee to show you how.

PHONE ROCKFORD, ILLINOIS 3-4881
TO HELP SOLVE YOUR PRODUCTION PROBLEMS

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Do the entire job with either Polyken tape

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Please send me free sample strips and further information on Polyken Electrical Tapes for one-step primary insulation.

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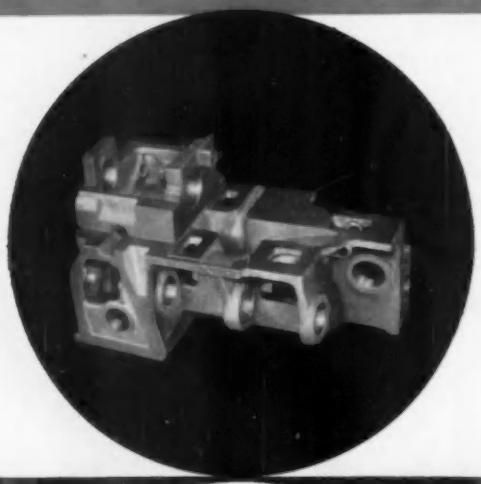


At Brown & Sharpe

Natcos Help From

At Brown & Sharpe, a 22-spindle Natco 3-way Machine handles finished drilling, boring and reaming on "00" screw machine beds

NATCO

Slash In-Process Time 16 Weeks to One Week

On Automatic Screw Machine Beds

Even on precise machine tool parts, traditionally handled on a "job-shop" basis, Brown & Sharpe gained great advantage by installing an automatic line. Prominent in the line are two Natcos, engineered and tooled to handle all drilling, boring and reaming on either the No. 00 or No. 2 automatic screw machine beds.

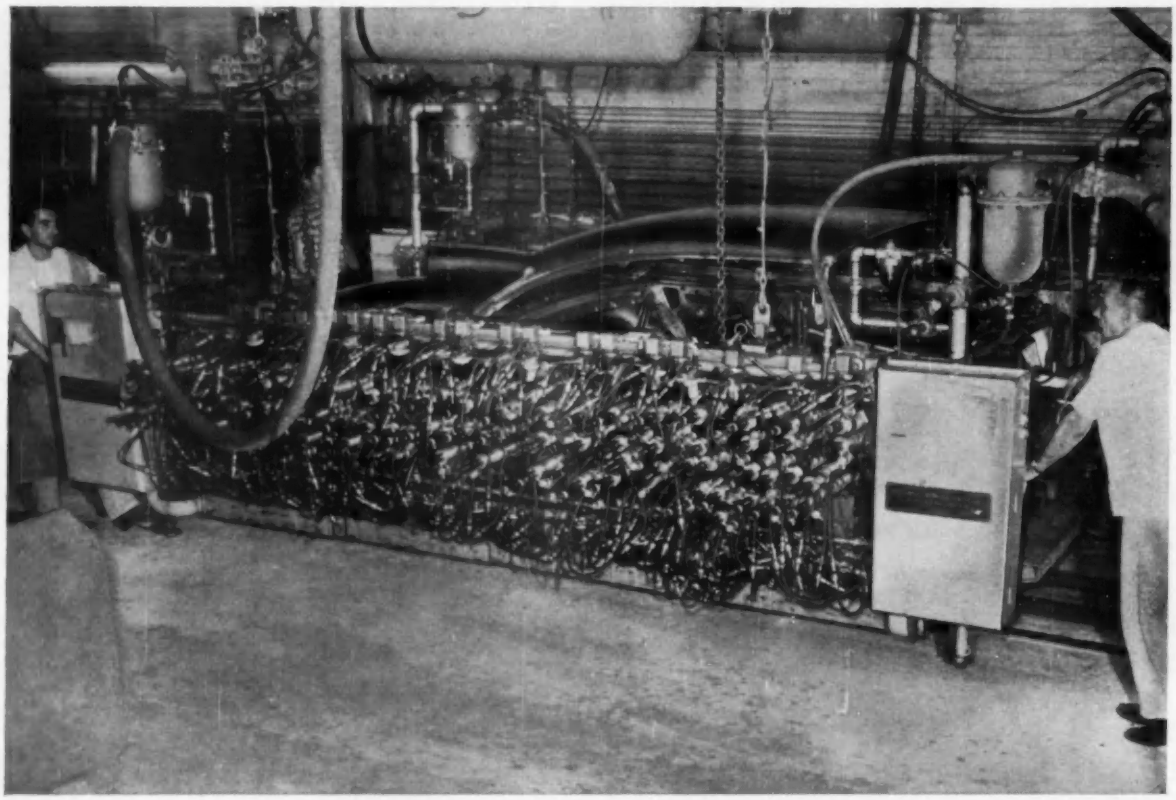
One Natco does all roughing—the second handles finishing. Total of 62 operations. Each Natco is tooled to process two parts at once—tooling is interchangeable to accommodate either sized bed.

Extreme machine tool accuracy must be maintained throughout. In one operation the Natco drills through five walls, holding centers parallel to the locating surface within .0015" for the full 42" distance. In another case, Natco engineering devised a tooling leaf that automatically drops through a core in the part, providing internal boring bar support.

Natcos make sense even on "job-shop" jobs. Call in a Natco Field Engineer—he can quickly tell you whether a Natco can be a cost-saver on your next job.

National Automatic Tool Company, Inc.

Richmond, Indiana *Multi-spindle drilling, boring, and tapping machines. Special machines for automatic production. Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.*



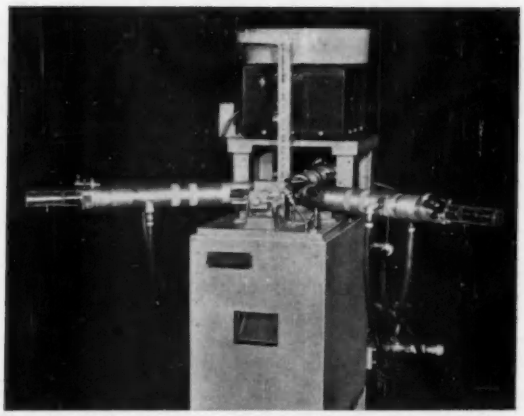
Pick the hole pattern and push a button

82 Keller "Airfeedrills"® produce any of 8 body trim hole patterns

This new Gardner-Denver fixture automatically drills the trim holes required for any of eight different body styles. The operator presses one button to select the hole pattern —another to start the drilling cycle. Keller "Airfeedrills" automatically advance, drill the holes simultaneously and retract. A similar fixture drills a matching pattern of holes in the other side of the body.

Complete Gardner-Denver drilling fixtures

Gardner-Denver engineers will gladly work with you and help analyze your *hole* production problem. They will design and build a fixture to increase production and cut costs. Write for details today.



Here's another complete Gardner-Denver fixture which consists of a welded table, three Keller "Airfeedrills" and a vibratory feeder. It automatically feeds a powdered metal sleeve, drills three 3/8"-diameter holes and drops the part through a chute. *Minimum* production is 600 pieces an hour.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

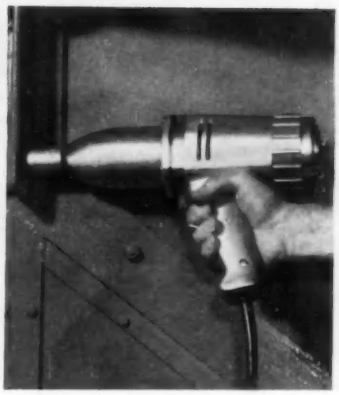
New B&D No. 300 Impact Wrench slashes maintenance down-time!

LONGER LIFE: torque tests show it has higher performance, cooler running, longer life than any other.

MORE POWER PER POUND: this light-weight (only 13.5 lbs.) tool really packs a powerful punch!

EASIER HANDLING: no nose or tail heaviness. No starting torque twist. All-position auxiliary handle.

No. 100 IMPACT WRENCH: the rugged wrench for smaller applications; hits max. torque in 6 seconds!



Mail coupon today for free demonstration!

Now, Black & Decker takes the back-break out of moving equipment, installing new tools, making structural changes and many other like jobs! The new No. 300 Heavy-Duty Impact Wrench brings a minimum of 300 ft. lbs. of torque to bear—removes rust encrusted bolts as slick as a whistle—bangs home bolts as big as 1¼" effortlessly. The powerful No. 300 does the work—not the operator!

Look about you! Chances are you'll see many applications for this great, new, super-powered Impact Wrench—the tool that sets and removes bolts faster; saves you time and money. Then, mail the coupon for a free demonstration. A Black & Decker distributor will be happy to show you—in your own plant, on your own equipment—just how much the new B&D No. 300 Impact Wrench can slash *your* maintenance down-time! THE BLACK & DECKER MFG. CO., Dept. 1411, Towson 4, Md. (In Canada: P.O. Box 278, Brockville, Ont.)

Look Under TOOLS-ELECTRIC in Yellow Pages

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Quality Electric Tools—Power-Built for powerful performance

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☐ Please arrange a demonstration of your new No. 300 Impact Wrench.

☐ Send additional information.

Name.....Title.....

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Address.....

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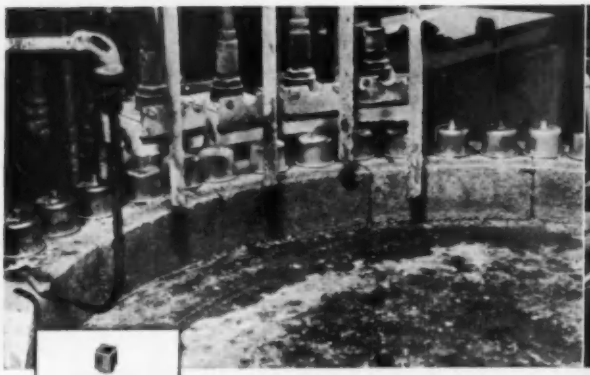
COMPLETE

JOIN WITH HANDY & HARMAN SILVER BRAZING FOR PERMANENT PROFIT



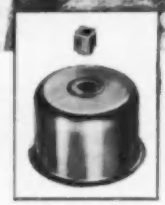


Table Lighter Cup—Spindle and cup are "painted" with a rich mixture of 180-mesh EASY-FLO 45 and HANDY FLUX in paste form. They are placed on revolving table which passes them under four gas-air burners in a 15-second heating cycle. The closing-spring latch is joined to the top of this lighter by torch brazing with EASY-FLO 45 Rod.

Pocket Lighter Top Assembly—This consists of the lighter top, wick housing, flint housing and cover spring housing, and requires three brazed joints. Parts are first assembled and dipped in HANDY FLUX. Next, operators place a single wire preform (EASY-FLO 45) which covers all three joints. Brazing is automatic as table carries assemblies under burners.

How RONSON® Makes Cigarette Lighters by the Hundred Thousand with EASY-FLO 45 Brazing

Here is a real "example in volume" of the advantages of Handy & Harman silver alloy brazing. Ronson Corporation, manufacturer of the world's best known lines of pocket and table lighters, meets its high-production joining requirements with simplicity, sureness and economy.

Everything Ronson requires—life-of-the-lighter strength, leak-tight joints and fast, easy assembly—is provided by silver brazing with EASY-FLO 45 and HANDY FLUX. Joining thousands of assemblies a day, for both table and pocket model lighters, is economical. The cost per joint is reckoned in mills.

This is an example that tells the silver brazing story all by itself—speed, strength, economy, low labor costs—all help make a product that everyone knows and millions use. That's how Handy & Harman alloys help make Ronson a name to depend on. How about your product? Could it use this remarkable joining method? Find out for yourself. Call Handy & Harman today.

TAKE A LOOK

. . . at Bulletin 20. This concise introduction to silver alloy brazing talks about joining methods, as well as joint design and economies that can be enjoyed with EASY-FLO brazing. We'll send you a copy whenever you request it.

Your NO. 1 Source of Supply and Authority on Brazing Alloys

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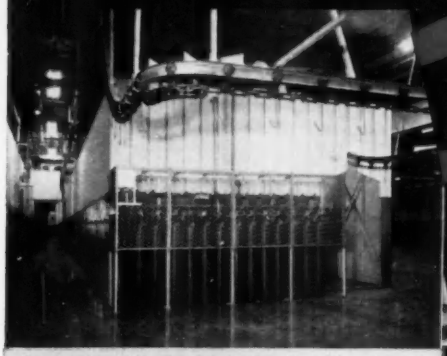
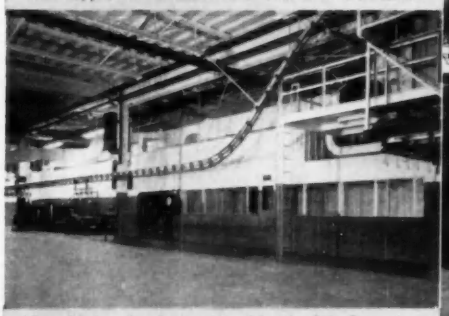


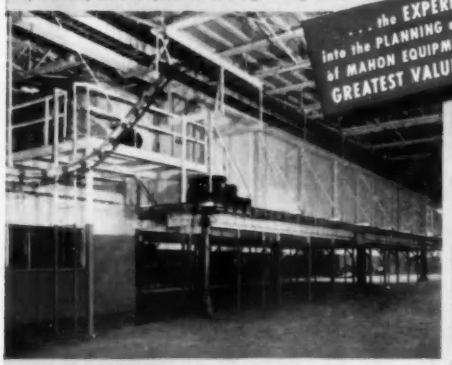
Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.



View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.

View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited. This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!



View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.

Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

Black Enamel Parts at CHRYSLER CORPORATION of CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail —automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-657.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

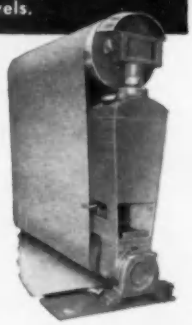
Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

HILL GRINDING AND POLISHING MACHINES
For FINISHING
Any and All
FERROUS and NON-FERROUS MATERIALS . . .

HILL Polishing Machine
(Hydraulic Table Type)
For polishing individual sheets and plates. Hydraulic reciprocating table with centralized controls.

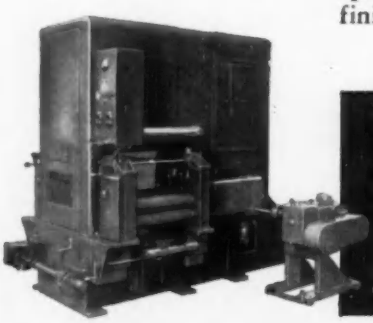
The basic HILL two-roll vertical head with upper steel idler roll and lower rubber covered contact or work roll (both dynamically balanced) over which the endless abrasive belt travels.



FLAT surfaces of ferrous or non-ferrous material can be brought quickly to the high finish so necessary for today's industrial and consumer products. The dairy, automotive, home appliance and engraving industries are typical of the wide range of application for these precise, labor saving machines.

HILL abrasive belt grinding and polishing machines are built in two general types. The hydraulic reciprocating table type polished individual sheets and plates. Table widths vary from 36″ to 60″. Table lengths range from 60″ to 240″. The Pinch-Roll type is for progressive line polishing. The HILL two-roll vertical head with endless abrasive belt is the basic principle common to both types.

When writing for information please indicate size and specifications of stock to be finished.



HILL Grinding and Polishing Machine
(Pinch-roll Type)
For pre-finishing, conditioning and polishing. Used as single units or in multiple units for progressive line polishing in wet or dry operations.

HILL ACME TOOLS FOR INDUSTRY

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ESTABLISHED 1882
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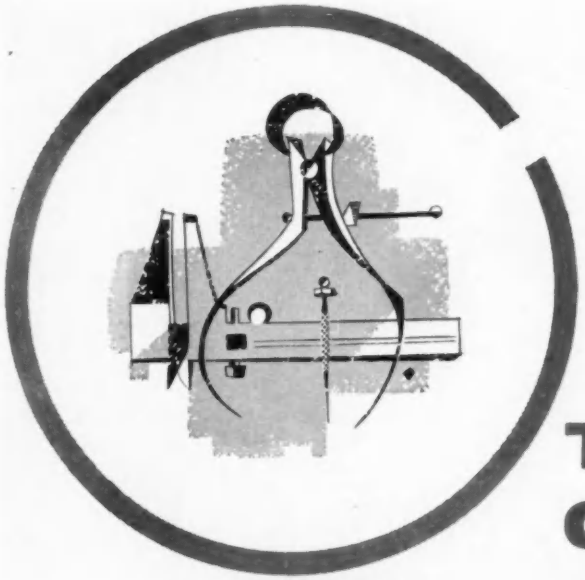

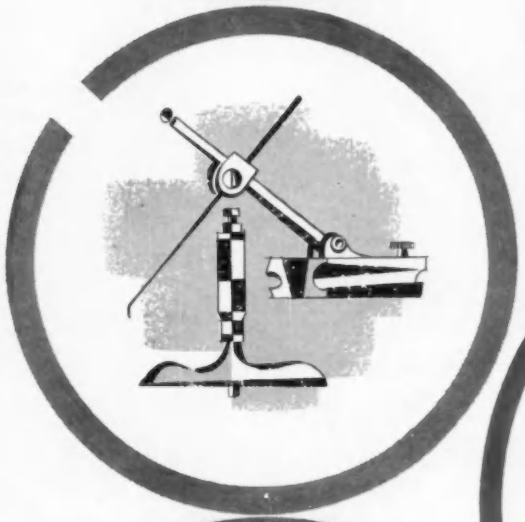

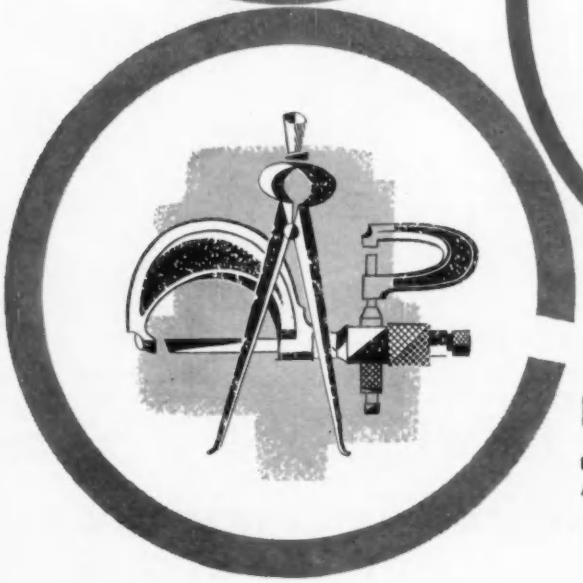

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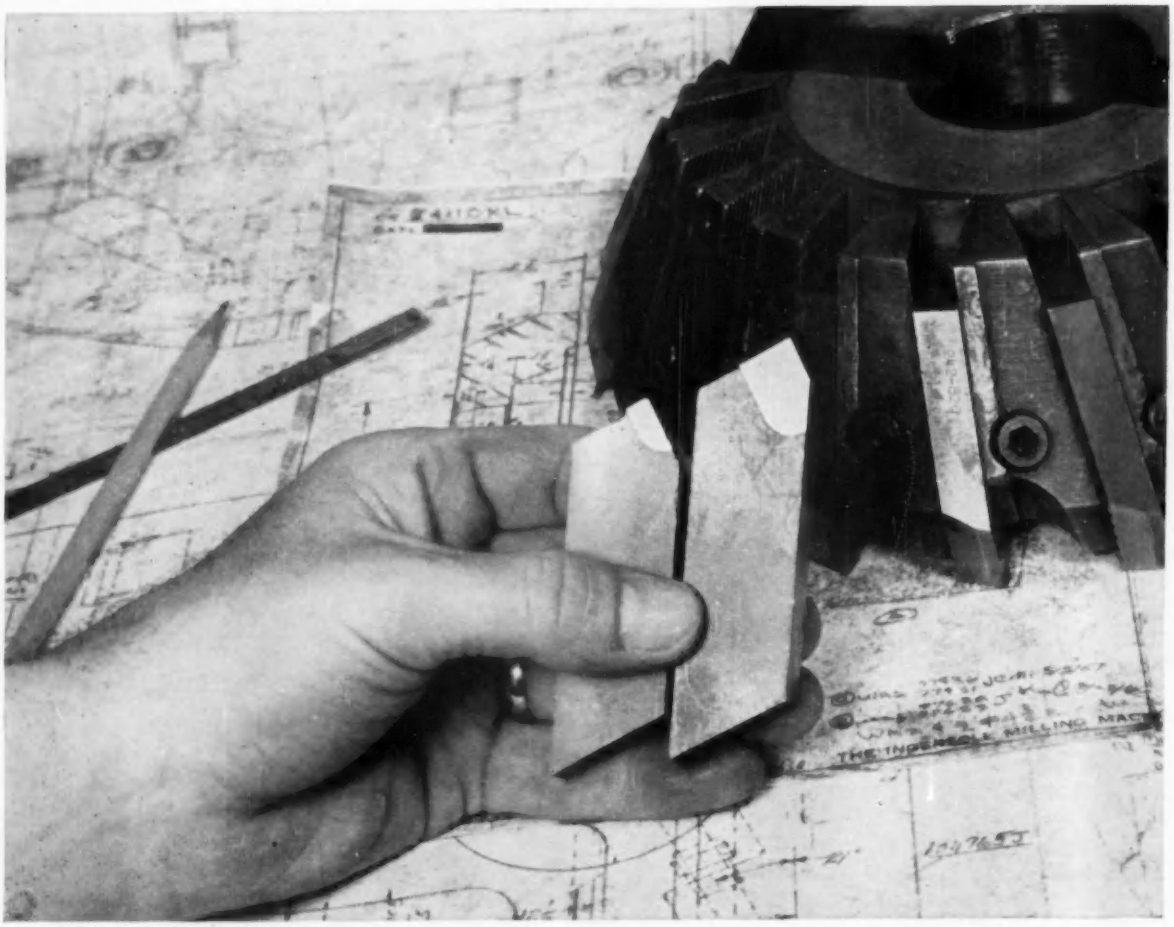

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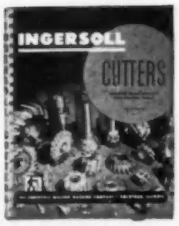
Most of the carbide in the worn blade was used, but this in itself does not mean that it was used effectively. Many factors are involved in developing the lowest milling cutter cost consistent with improved finishes, faster feed rates and longer tool life.

A continuous review of these factors is part of the day-to-day responsibility of your Ingersoll cutter salesman and of the staff of milling experts he represents. This part of our product has proved its value to hundreds of concerns.

We will welcome an opportunity to tell you more about this service. Write:



If you do not have a copy of this book, write us and we will send you one. It describes in detail the complete line of Ingersoll inserted blade milling and boring tools. Ask for Catalog # 661

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LORD DYNAFLEX® JOINT—a long-wearing, lubrication-free resilient bearing for pivots.

With LORD Dynaflex® Joints you have a new, better answer to problems on pivot joints. One that eliminates wear and lubrication . . . absorbs shock and reduces noise . . . assures mounting and alignment accuracy.

These new, high-capacity resilient bearings provide positive cushioned action—and accommodate static and dynamic radial loads encountered in heavy duty commercial vehicles, torsional deflections up to ± 30° and angular deflections up to ± 7°. Fatigue-defying flexing elements are specially compounded rubber, permanently LORD-bonded to steel members. Design is simple and compact, requires no close tolerances, and usually will fit present equipment with little or no change in mating parts. No metal rubs against metal.

Bonded rubber Dynaflex Joints are the product of LORD development engineers who can produce special designs to solve your specific pivot point application. For further information, contact your nearest LORD Field Engineer or write the Home Office, Erie, Pa., for Bulletin No. 703.

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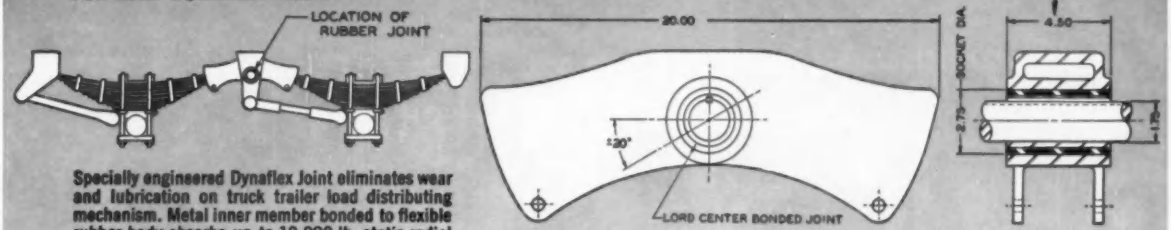
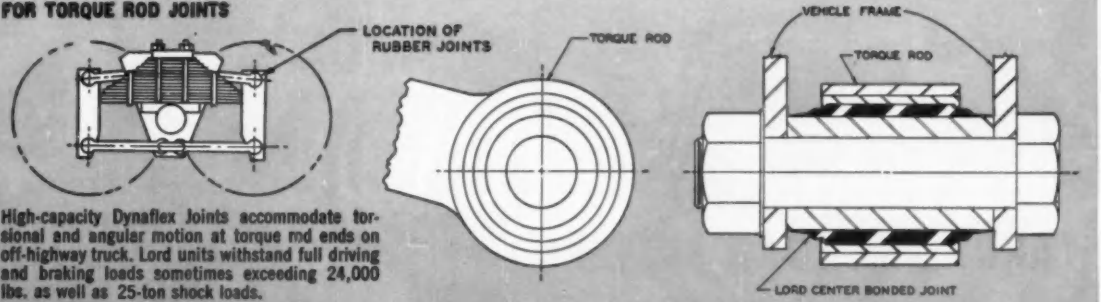


Specially engineered Dynaflex Joint eliminates wear and lubrication on truck trailer load distributing mechanism. Metal inner member bonded to flexible rubber body absorbs up to 10,000-lb. static radial load and torsional deflection of ± 20°.

FOR TORQUE ROD JOINTS



High-capacity Dynaflex Joints accommodate torsional and angular motion at torque rod ends on off-highway truck. Lord units withstand full driving and braking loads sometimes exceeding 24,000 lbs. as well as 25-ton shock loads.

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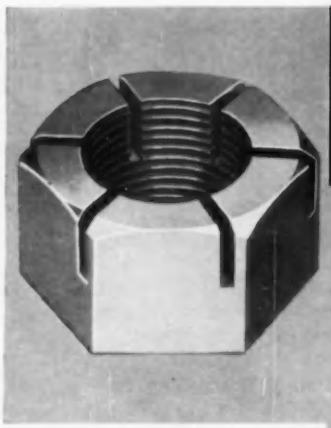
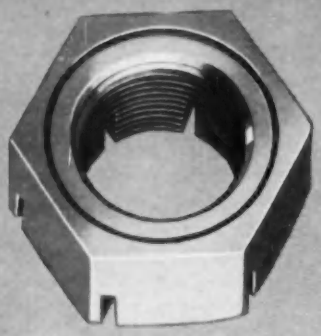
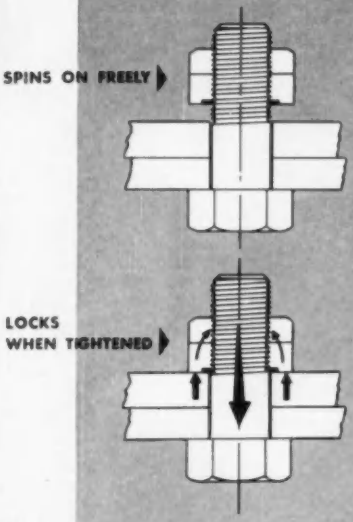


the
MARSDEN
free running lock nut





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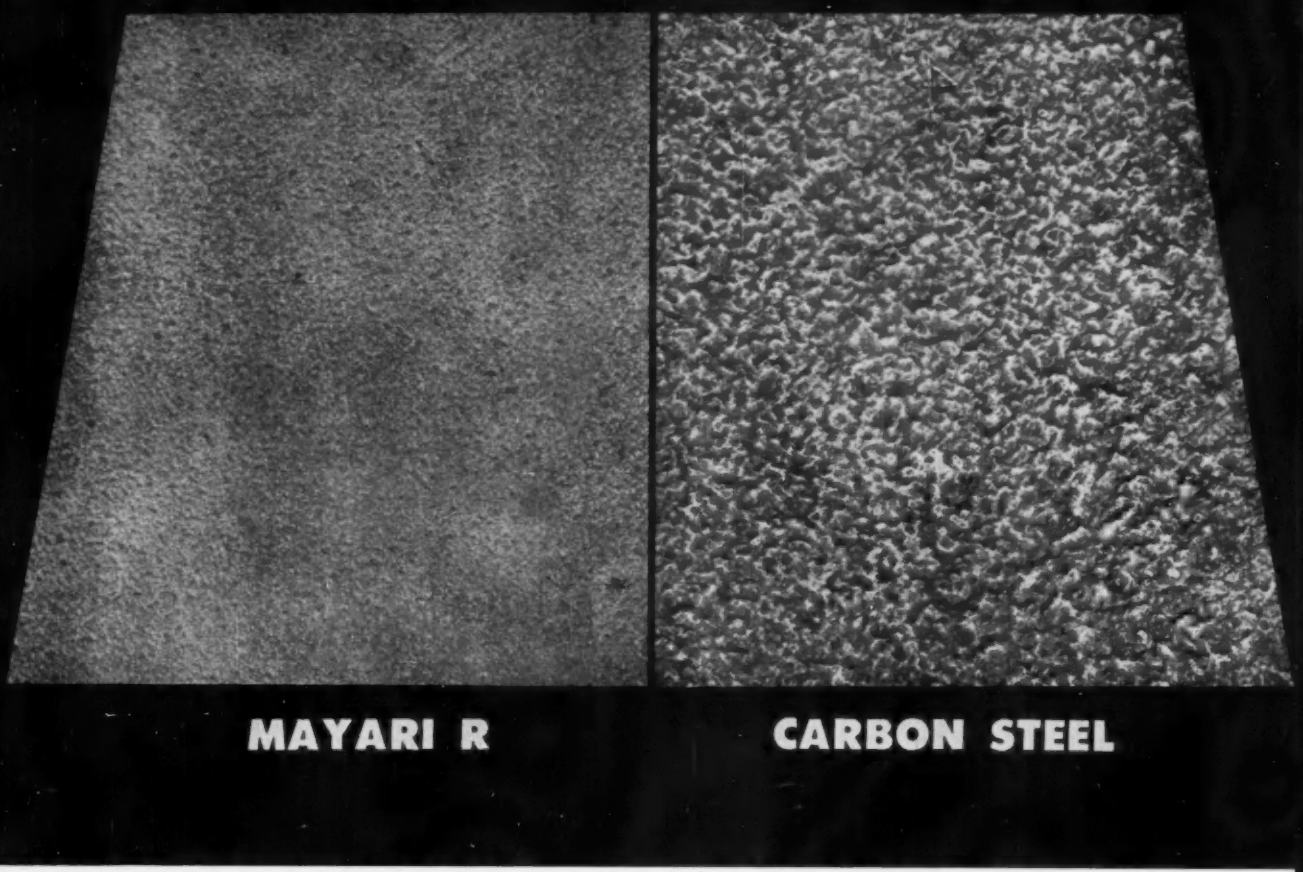


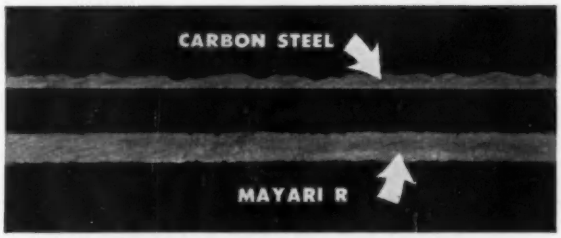
The test specimens as seen from above. After 5 years' exposure the Mayari R is relatively smooth while the carbon steel is deeply pitted.

See the difference after 5 years' exposure

You can see what corrosion has done to these steel sheets. One is plain carbon steel, the other is Mayari R high-strength, low-alloy steel. Originally, both were ⅛-in. thick. They were exposed together in industrial atmosphere for 5 years. During this period the carbon steel sheet lost so much through corrosion that it had to be replaced, but there was no appreciable loss of thickness in the sheet of Mayari R.

There is a simple reason why Mayari R has such excellent resistance to atmospheric corrosion. When this steel is exposed, a thin, tight layer of rust forms on the surface to act as a protective coating. This rust does not flake off in the manner of carbon steel rust. Instead it holds securely to the surface and retards further corrosive action. As a result, Mayari R has from 5 to 6 times more resistance to atmospheric corrosion than plain carbon steel, and from 2 to 4 times more than copper-bearing steel.

Mayari R also has other advantages. It has a higher yield point and greater tensile strength than ordinary carbon steel, and better resistance to many kinds of abrasion. It can be used to save steel, to reduce surplus deadweight, and to increase service life. Write or call the nearest Bethlehem sales office for further details.



This enlarged photograph shows cross-sections of a carbon steel sheet and a Mayari R Sheet after exposure.

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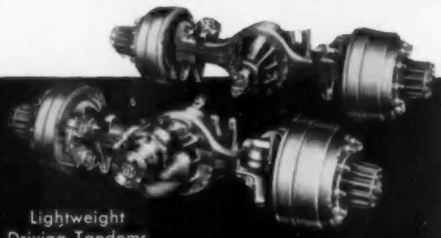
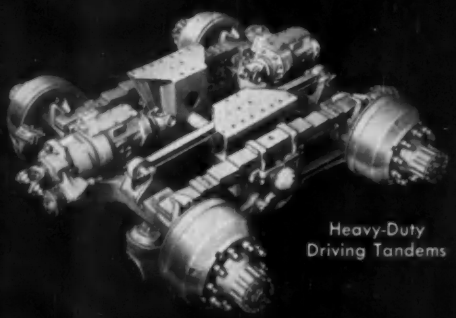
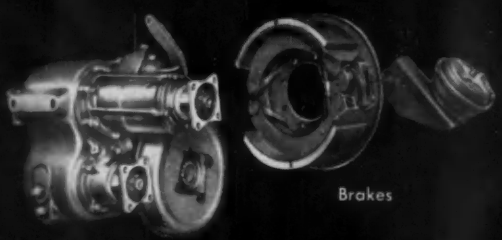


Lightweight Driving Tandems

Trailer Axles



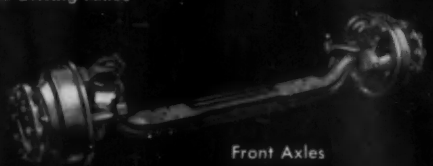
Heavy-Duty Driving Tandems



Brakes

Gear Boxes

Single Driving Axles



Front Axles

Whether your requirements call for highway or off-the-road equipment—Timken-Detroit offers torture-tested axles and brakes proven by almost 50 years of field testing and laboratory research!

Timken-Detroit meets all your requirements for driving, trailer and front axles . . . brakes and gear boxes . . . with a complete range of capacities in each product category. Shown here are some of the units included in the complete line.

Nearly 50 years of manufacturing experience—plus continuing field and laboratory research—have taught Timken-Detroit the exacting needs of the trucking industry. Timken-Detroit Axles and Brakes are designed and built to give you the utmost in service, safety and dependability.

To you—this leadership in power transmission and braking systems means more productive road time, reduced operating costs and lower maintenance expense. Timken-Detroit Axles and Brakes are engineered to carry more payload . . . and stop more payload . . . at lower operating costs under all conditions.

The Timken-Detroit line of Medium and Heavy Duty Double-Reduction Tandems is an example of the superior engineering features and quality built into every Timken-Detroit product.

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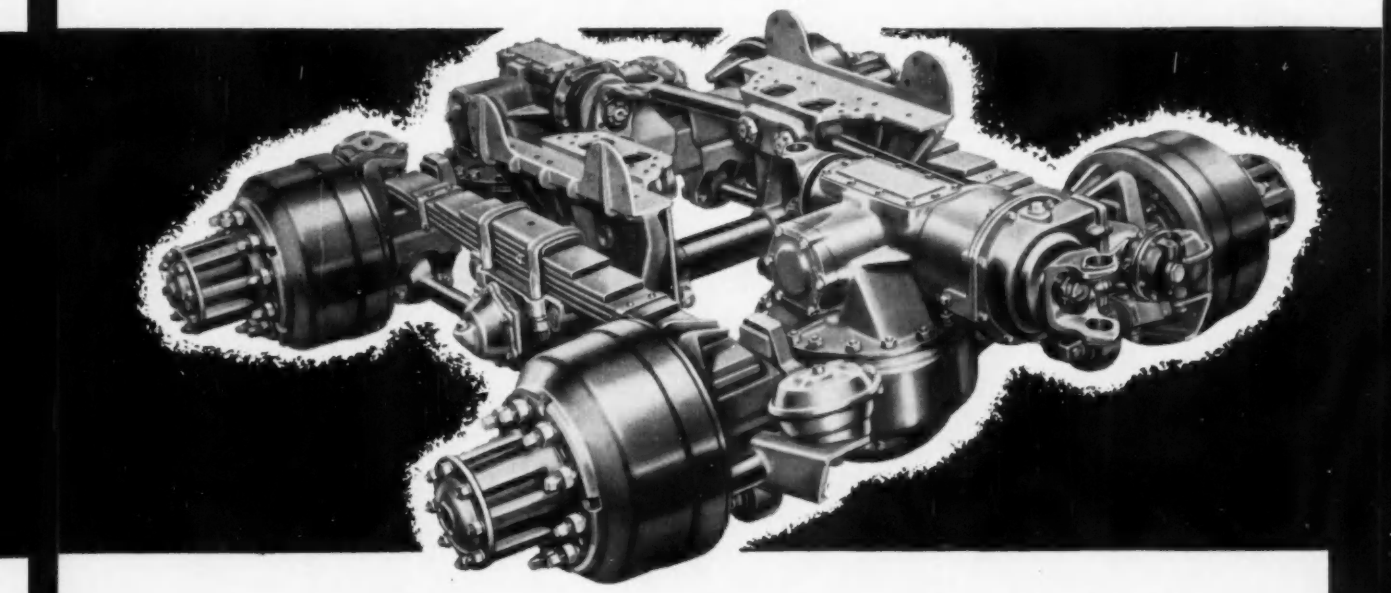

Timken-Detroit Heavy-Duty Double-Reduction Tandems Give You Payload Leadership!

Ability to take the toughest going and still deliver the load on time has helped make these rugged tandems the number one choice with operators of heavy-duty vehicles. These tandems give you the big advantages of long trouble-free service, economical performance and utmost dependability.

Here are a few of the features developed in famous Timken-Detroit Tandem Drive Units—

"Cradle Ride" Suspension... free ends of long, resilient springs float in axle spring guide brackets. This permits axles to articulate freely, adjusting themselves to road irregularities. Floating springs cradle the vehicle, materially reducing road shock and eliminating source of vehicle flutter. "Cradle Ride" suspension stabilizes the load, permits easy, restful driving . . . improves driver control and safety. Driving and braking forces are transmitted only through torque rods.

Hypoid Gears with their larger pinions and greater tooth contact give you outstanding performance, top efficiency and long life—plus lower maintenance costs.

Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to turn faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work. Driving parts and tires last longer. Controlled from the cab, differential can be locked out at any speed to give positive through drive.

Rectangular Shaped Axle Housings are forged from high carbon steel. This rectangular shape, combined with full strength corner sections, provides the greatest strength possible with minimum weight and size.

Famous Torsion Flow Axle Shafts are made even stronger through the use of more splines and greater root and body diameter.

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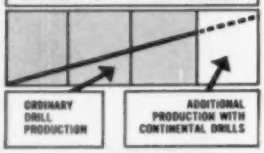

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A Severance CARBIDE ECONO-SINK WILL GIVE YOU —

- INCREASED ACCURACY
- MORE PRODUCTION
- LESS DOWN-TIME
- SMOOTHER SEATS
- AND A COMPLIMENT FROM THE BOSS FOR SUGGESTING THE CHANGE
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Chatter-Free DESIGN
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MAKE THE Switch to Carbide BEFORE IT'S TOO LATE

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MICRO-MILLS & BORE-MILLS
BALL SEAT REAMERS

DYKEM STEEL BLUE

Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2301L North 11th St. • St. Louis 6, Mo.

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END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

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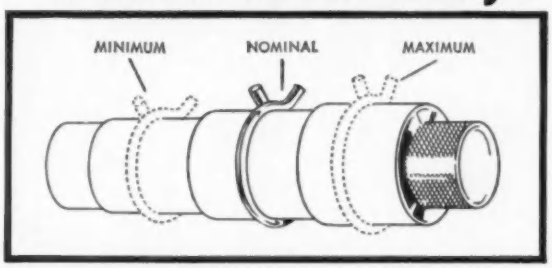
AUTOMOTIVE INDUSTRIES is read by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to The World's Largest Manufacturing Industry.

Constant Concentricity



Insures Constant Clamping

CORBIN Self-Tightening Hose Clamps are designed to maintain perfect-circle concentricity and constant clamping pressure on every application, regardless of service expansions or contractions of the hose. That's why CORBIN Hose Clamps never need adjustment . . . positively prevent leaks and shortened hose life caused by "pinching" clamps on oversize new hose, or service-shrunk connections.

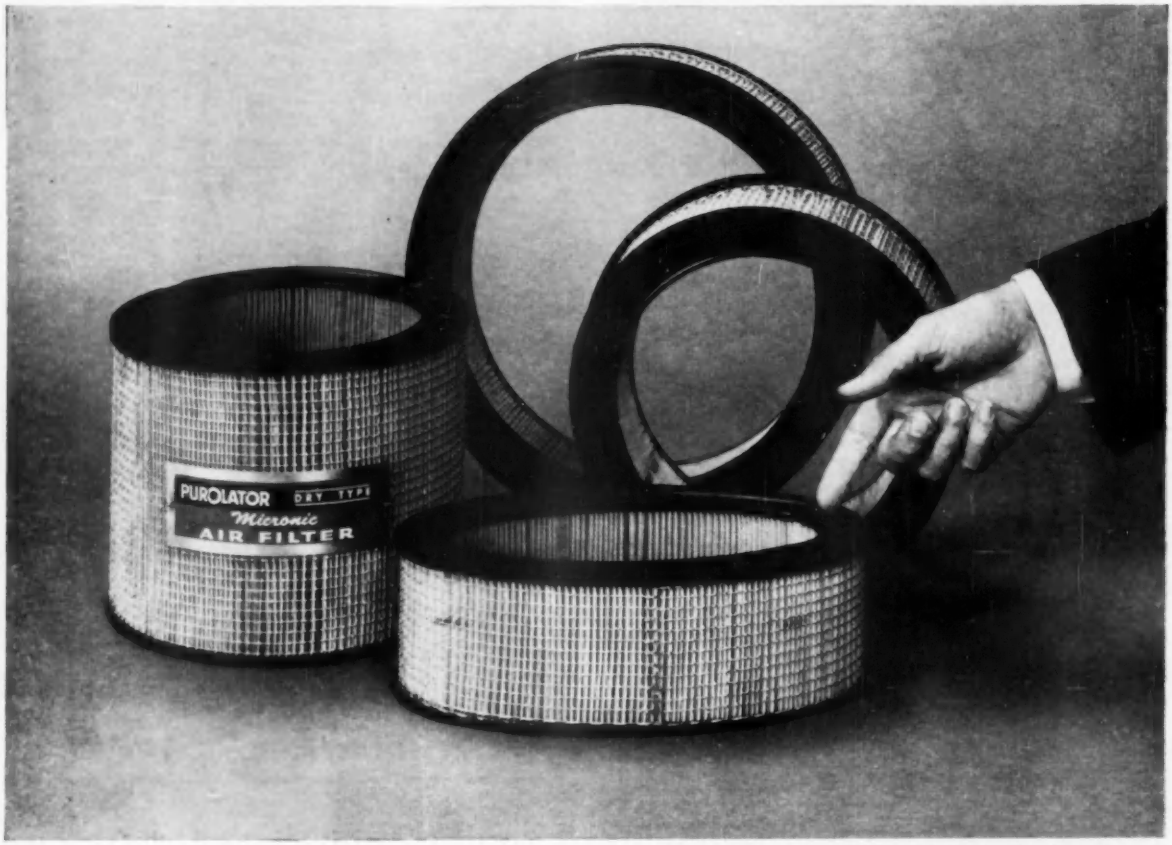
Available in sizes ⅜" to 2⅝". Immediate delivery. Safe, simple to install. CORBIN Self-Tightening Hose Clamps are used by virtually every automotive and appliance manufacturer in the U.S.A. Write for *new* Service and Engineering Bulletin #HC18. Corbin Hose Clamp Division, The American Hardware Corporation.

The Original Manufacturer of Self-Tightening HOSE CLAMPS — CORBIN

NEW BRITAIN, CONNECTICUT

Another new development using

B.F.Goodrich Chemical *raw materials*



Dry type Micronic air filters are mady by Purolater Products, Inc., Rahway, N. J. in a variety of shapes to meet automotive requirements. End rings made from Geon supplied by B.F.Goodrich Chemical Company stay strong and flexible despite severe service.

Geon materials simplify air filter design

THESE dry-type Micronic automotive air filters were formerly made by assembling the filter element with metal end rings. This required a cementing operation, and a gasket was needed for sealing.

Now the end rings are formed by simply dipping the filter element into a mold containing a plastisol based on a Geon polyvinyl material. This eliminates the metal fastening operation, and since the plastic is moderately flexible, no gasket is required. In addition, with this design the manufacturer finds it more economical to tool up for the many sizes and shapes of filters needed in different cars.

Geon polyvinyl materials offer outstanding properties—resistance to water, oil, most chemicals, to wear and abrasion. And they are easily formed by molding, extrusion, calendering, casting, etc. For ideas on using Geon to advantage in your products, write Dept. FZ-6, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
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B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

ENGINEERING – FOUNDRY – MACHINING

Behind the world-wide reputation of Zollner Pistons is an unrivaled record of service to engine builders. Typical of advancements in piston design provided by Zollner engineering leadership are Clear-O-Matic, Bond-O-Loc, Perma-Groove and many adaptations of Zollner basic design advantages to specific engine builder requirements.

Whatever your needs may be for piston castings or precision finished pistons, we cordially invite your full use of our cooperative engineering service and complete production facilities.

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FORT WAYNE, INDIANA

DETROIT OFFICE: Jaikin Bldg., Birmingham, Mich.

Aircraft Torque Wrench

Split Bearing Race

Pump Part

Slitter Knife

Machine Tool Part

Collet

For tricky shapes like these...

Steel that's hard and tough but easy to machine

PARTS like slitter knives, collets, split bearing races and the others shown above have to be hard and tough. But because of their intricate shapes, they have to be made of a steel that's easy to machine. This combination of toughness and machinability isn't easy to find. But you get it in Timken® 52100 steel.

Timken 52100 steel has a fully spheroidized structure that makes machining easy—without sacrificing strength or hardenability. It is a high-carbon analysis alloy steel with high fatigue and tensile strength and good hardenability throughout its cross section. Timken 52100 steel withstands working pressures up to 200,000 p.s.i., can be oil quenched to a maximum hardness of 65/66 Rockwell C in normal sections. And you can be sure of uniform quality in every shipment of Timken 52100 steel, because the Timken Company controls quality through every production step, from furnace to final inspection.

The Timken Company pioneered the production of 52100 steel tubing in the U. S. We're one of the world's largest producers of this hard, tough steel and the *only* source of 52100 steel in three finished forms—bars, tubing and wire. For small run or emergency requirements, we maintain a mill stock of 52100 tubing, in 101 sizes ranging from 1″ to 10½″ O.D. Write for a complete stock list of available sizes, grades and finishes. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

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